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JAMES J. DAVIS, Secretary
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ETHELBERT STEWART, Commissioner

JUN 22 1929

# MONTHLY
# LABOR REVIEW

Vol. 28, No. 6 June, 1929

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Protection of workers against removal of railroad terminals, p. 11

Radium poisoning survey, p. 20

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1929

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Wages and hours of labor of common street laborers, 1928. Bulletin No. 484.

Labor legislation of 1928. Bulletin No. 486.

Wages and hours of labor in woolen and worsted goods manufacturing, 1910 to 1928. Bulletin No. 487.

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# LABOR REVIEW

VOLUME 28 NUMBER 6

JUNE, 1929

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1929

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15 CENTS PER COPY

SUBSCRIPTION PRICE, PER YEAR

UNITED STATES, CANADA, MEXICO, $1.50; OTHER COUNTRIES, $2.25

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## This Issue in Brief

*The 5-day week is becoming increasingly prevalent in American industry.* Its most rapid progress has been made in the building trades, the men's clothing industry, and the automobile industry; but it is of growing importance in many other industries, such as in foundries and machine shops where in 1928 the 5-day week in whole or in part was in effect in 4.2 per cent of the total number of establishments covered in the survey by the United States Bureau of Labor Statistics. An article (p. 1) reviews the present extent of the 5-day week and gives the experiences of certain companies operating under this system.

*The manufacture of luminous watch and clock dials* has resulted in a number of fatal and serious cases of poisoning from the radioactive substances used in the luminous paint. A survey by the Bureau of Labor Statistics revealed a total of 33 suspected fatal and living cases, all of which had developed since 1922, among persons who had been employed as dial painters. This is regarded as a large number in view of the fact that probably not more than 2,000 individuals have been employed in this work in the 16 years since the industry started. The Commissioner of Labor Statistics recommends in a foreword to the report that in view of the subtle action of the material, the length of time elapsing before the appearance of serious symptoms, and the lack of uniformity in measures of protection, that probably the only method of safety which will convince everyone is to give up entirely the manufacture of luminous objects. Page 20.

*The report of the Committee on Recent Economic Changes* reviews the vast changes in the industrial life of the United States which have occurred during the past few years. In the field of labor, the committee finds that from 1922 to 1927 there was an increase of 2.1 per cent per year in the purchasing power of general wages. Page 96.

*Railroad employees' losses due to the removal of railroad shops and terminals must be shared by the railroad* according to the opinion in the Texas and Pacific Railway arbitration case, reported to the President on April 20, 1929. The arguments for and against the railroad's liability in these cases, the action of the railroad brotherhoods, the legislation of the States, of Congress and of Canada, with decisions of courts and the cases of voluntary payment by railroads to employees for losses of their capital savings invested in homes due to the removal of railroad terminals have been reviewed on page 11.

*The wages and hours of labor of common street laborers* in American municipalities are compiled in a recent study by the Bureau of Labor Statistics. Of the 2,626 municipalities reporting, 23 per cent were paying 40 and under 45 cents per hour, 34 per cent paid under 40 cents per hour, and about 15 per cent paid 55 cents or more. As regards hours of labor, 53 per cent of the municipalities reporting had a working week of 48 hours or less, while in 13 per cent the laborers had a 60-hour week. Page 183.

*The average expenditure for one-family dwellings increased nearly a thousand dollars between 1921 and 1928* according to building permits issued in cities having a population of 25,000 or over. In the same period the wholesale price of building material has decreased 3.8 per cent and union wage rates in the building trades have increased 29 per cent. Page 151.

*The trend toward apartment houses as dwelling places is still in full swing.* Over 50 per cent of the family dwelling places for which permits were issued during 1928 were in this class of dwelling. In cities having a population of a half million or over more than two-thirds of the new family accommodations provided during 1928 were in apartment houses. Page 154.

*Turnover of labor among a group of Philadelphia workers* was found to have been to the financial advantage of a considerable number of the employees. While all men who changed their places of employment did not improve their economic status, and while all who gained in weekly earnings did not do so in the same way, it still appears that to an appreciable degree rolling stones did gather moss in the sense of improved weekly earnings. Page 118.

*Increased productive efficiency in the dairy industry* has resulted in an increase of 30 billion pounds of milk per year during the period 1921 to 1927, with practically no increase in the number of cows, and, as a result, with practically no extra labor. Also of interest is the fact that, from an actual study of 100,000 cows, it was found that cows producing 9,000 pounds of milk per year, which is about twice the average production, consumed only about 40 per cent more food. Page 116.

*That the recognized national or local safety codes for the building industry* should be written into all labor agreements and building contracts is urged in an article by the Commissioner of Labor Statistics. Page 134.

*A noteworthy reduction in accidents* on the Norfolk & Western Railroad has taken place in recent years. The number of employees killed decreased from 61 in 1912 to 21 in 1927, and to 12 in 1928. Page 137.

*A decision of the Colorado Industrial Commission* grants to the mine workers in certain unorganized mines the right of collective bargaining and the same scale of wages and working conditions as those now in effect in the Rocky Mountain Fuel Co., fixed by agreement with the United Mine Workers of America. Page 180.

MONTHLY
# LABOR REVIEW
OF U. S. BUREAU OF LABOR STATISTICS

VOL. 28, NO. 6 WASHINGTON JUNE, 1929

## Progress of the 5-Day Week

THE recent adoption of the 5-day week in the New York City building trades, affecting some 150,000 workers, has aroused renewed interest in the whole subject of the 5-day week in American industry.

An article published in the Labor Review, December, 1926, gave data regarding the prevalence of the 5-day week at that time, in so far as information was available to the bureau from its wage surveys, its studies of collective agreements, etc. The present article reviews subsequent developments and presents a brief survey of the prevalence of the 5-day week at the present time, the sources of information being the same as in the previous article.

### Extent of 5-Day Week in Larger Industries

OF THE LARGER industries, the men's clothing industry continues to show by far the largest number of establishments and the largest number of employees working a regular 5-day week schedule. In the survey of wages and hours of labor in this industry made by the Bureau of Labor Statistics in 1928, it was found that 53 per cent of the establishments with 33 per cent of the workers employed had a 5-day week, as compared with 49 per cent of the establishments and 32.3 per cent of the workers with a 5-day week in the year 1926.

The automobile industry showed a very great extension of the 5-day week between the 1925 and the 1928 wage surveys by the Bureau of Labor Statistics. In 1925, 1.5 per cent of the employees were working a regular 5-day week, whereas in 1928 this percentage had increased to approximately 30.

In the organized building trades a rapid extension of the 5-day week has occurred during the past few years. In 1926, 6.6 per cent of the building trade workers were employed on a regular 5-day-week schedule and 0.6 per cent were working five days a week for part of the year. In 1928, the percentage working a regular 5-day week had increased to 14.6 and the percentage working five days a week for part of the year had increased to 1.4. The building trades most affected by the short week were the lathers, painters, and plasterers.

The above data regarding the building trades are based on the bureau's union wage survey of May 15, 1928. Since that time there has apparently been a marked extension of the 5-day week in the building industry. A national survey by S. W. Straus & Co. found

as follows, according to a statement published in the Washington Star of May 4, 1929:

"From an economic standpoint the most important current development in the building industry in this country is the rapid drift toward the 5-day week," says the report. "Following its recent adoption by the 12,000 bricklayers in New York City, evidence is at hand indicating the possibility of the entire industry in the metropolis adopting the short-week schedule.

"According to C. G. Norman, chairman of the board of directors of the New York Building Trades Employers' Association, the 150,000 building craftsmen in New York and immediate suburbs will be on the 5-day schedule by January 1 next. * * *

"In Chicago plasterers and painters are now on the short-week basis, and in other trades the schedule will be one of the major points of discussion on new wage agreements June 1.

"St. Louis comes nearer being completely on the 5-day plan than any other American city. The following building trades are now operating on it there: Carpenters, plasterers, cement finishers, elevator constructors, electric workers, lathers, sheet-metal workers, plumbers, steam fitters, asbestos workers, and all craftsmen connected with the painter's trade.

"The 5-day week is gaining considerable headway on the Pacific coast, particularly in San Francisco, Portland, and Seattle, but has made no appreciable progress in Los Angeles because of the open-shop basis.

"Considerable progress is reported in various other important building centers in all parts of the country."

In the organized granite and stone trades, the regular 5-day week throughout the year was uncommon, but 12.9 per cent of the members in 1928 were working on a 5-day schedule for part of the year.

Other organized trades in which the 5-day week is in effect for a few locals are the linemen, with 2 per cent of the membership so employed, and newspaper printing and publishing, with 1.4 per cent of the employees on a 5-day week and 5 per cent with schedules calling for six days' work but for a total of 40 hours or less per week.

According to the bureau's surveys, employees of foundries and machine shops working on a 5-day week increased from 3.5 per cent of the total in 1926 to 4.1 per cent in 1928, and the shops working in whole or in part on the 5-day schedule increased during the same period from 3.8 per cent to 4.2 per cent of the total.

In the boot and shoe industry, according to the surveys made by the bureau, about 1 per cent of the employees were working five days a week in both 1926 and 1928.

In the iron and steel industry the 1926 survey showed 2.1 per cent of the employees working a regular 5-day or 5-night week, most of the 5-turn workers being in the bar mills (13 per cent of the total employees therein) and the puddling mills (6 per cent of the total employees therein). A new survey of wages and hours of labor in the iron and steel industry is now under way but the results are not yet available.

In the other large manufacturing industries covered by the bureau's regular wages and hours survey, such as the textile industries, slaughtering and meat packing, and sawmills, the 5-day week was either entirely absent or of negligible importance.

### Provision for 5-Day Week in Trade Agreements

IN ADDITION to cited instances of the 5-day week in major industries, several trade agreements provide for the 5-day week in certain factories or localities. The following is a list of such trade agreements as have come to the attention of the bureau.

Fur workers of Boston, Chicago, and New York have the 5-day 40-hour week the entire year.

Cloth hat and cap workers in Milwaukee, New York, and Philadelphia have the 5-day 40-hour week through the entire year.

Cloak, skirt, and dressmakers and waterproof garment workers of Boston have the 5-day 42-hour week.

The waterproof workers, cutters, pressers, buttonhole workers, and embroidery workers of New York City have the 5-day 40-hour week.

The cloak, skirt, dress, and reefer makers of New York City have the 5-day 40-hour week.

Wood carvers of Boston, New York City, and Rochester, N. Y., have the 5-day 40-hour week.

Upholsterers of Boston and New York City have the 5-day 40-hour week. Mattress and box-spring makers of New York City have the 5-day 40-hour week for the months of January, February, June, July, and August and the 44-hour week for the rest of the year.

Butcher workmen of New Orleans, La., have the 5-day 40-hour week.

Butcher workmen of the kosher plants of New York City have the 5-day 42½-hour week.

Pocketbook workers of New York City have the 44-hour week. From June 15 to September 1, by mutual consent of employer and employees, the 44 hours may be worked in five days.

## Experience of Various Establishments with the 5-Day Week

THE PRACTICABILITY of the 5-day week has been widely debated. Some of the principal arguments for and against such a policy were given in the Labor Review for December, 1926. Very few facts, however, are available regarding actual experience with the 5-day week, and such of these experiences as have come to the attention of the bureau all relate to establishments where the 5-day week has been tried and found satisfactory. Certain examples of this character are given below.

### CONSTRUCTION COMPANY

[Industry, Boston, November 13, 1926, article signed by Jerome R. George, vice president Morgan Construction Co.]

You have extended an invitation to members of the Associated Industries of Massachusetts to express their opinion on the 5-day work week.

I do not agree with those who think it is a fool proposition. There are so many other ways better adapted to securing economy in the operation of most plants than to start them up and run for a few hours Saturday morning that I have no particular regard for this fractional day of work.

For about five years the company with which I am associated has operated its plant quite successfully on a basis somewhat like the plan recently adopted by Mr. Henry Ford. This plan of the Morgan Construction Co. is the result of many years of experience and study of the hours of work problem and was adopted not for the particular benefit of the employees, but because it was the most economical plan for the company. It was adopted, however, without any fear as to the benefits which would result to the employees from increased leisure time.

The general principle underlying our plan is the same as under the Ford plan—namely, to work our invested capital the maximum number of hours per week consistent with living standards which can and ought to be maintained in this age of machine production.

Under this plan we work our machinery 88 hours per week and our men 44 hours, in two shifts, one of which works only five days per week.

No one works from 11.40 p. m. to 6.30 a. m.; no one works, excepting plant repair men, on Saturday after 12.30 noon, and there is of course no work of any kind done on Sunday.

I quite realize that not every industry and not every plant built on the basis of a definite plan of operation with respect to a definite volume of business can operate on the Morgan plan or on the Ford plan, but it does seem to me quite possible that if more people understood that Mr. Ford works his money and machinery, under his new plan, 120 hours per week out of a possible 168 (or 72 per cent), there would be less criticism from those who operate on a less economical basis.

The weakness of the Ford plan is not so much that he fails to work Saturday morning as that he does work his men from midnight to morning, over which period he admits production is relatively unsatisfactory.

The weakness of the ordinary plan of plant operation is not so much that employees work too many or too few hours, but that the machinery is worked only 25 per cent to 35 per cent of the time as a maximum and 20 per cent to 30 per cent on the average.

### WILLIAM WRIGLEY, JR., CO.

[System, Chicago, January, 1927, p. 9]

Ninety-seven per cent of our employees, or the whole production side of our business, have been working on the 5-day week basis since 1919, and I can not imagine that they would consent to going back to the old 5½-day schedule.

Our 5-day week is a distinct advantage to our employees, and we are not losing anything ourselves by keeping to it. First of all, by using it we find that it is much easier for us to get employees.

Our employees work just as many hours as before, 45½ hours a week for women, 48 hours a week for the men. They show no objection to coming to work a little bit earlier and working a little bit later; they make as much money, and when Friday night comes they have two full holidays ahead of them, long enough for a fishing or camping trip.

There is likely to be distraction and some inattention to duty on Saturdays in a factory that closes at noon. We have done away with that. There also is a speeding up period at the start of the day and a slowing down period at the end of the day in practically any factory. When those are introduced into a Saturday half day they are proportionately more important and expensive than on a full day.

The items of power and heat are other important considerations. It is expensive to step these up and slow them down again for a half day. We do not have to.

I am confident that our experience is typical of what others may expect—that any manufacturer who puts the 5-day week up to his employees on the basis adopted in our plants, and gives it a fair test, will never go back to his former 5½-day schedule.

### SILK AND MUSLIN UNDERWEAR MANUFACTURERS

[Letter to Bureau of Labor Statistics under date of December 24, 1926]

Reading an article in the Evening Sun on December 23, we note you make mention of the fact that the 5-day week is more or less prevalent in American industry at the present time.

As a matter of historical accuracy, we would call your attention to the fact that we established a factory at ———, nine years ago, which has been in continuous operation since the day it started, working about 51 weeks per annum, and on a 5-day week schedule.

We also started a factory at ———, which has been in continuous operation since its inception, and which has always been working on a 5-day schedule.

Both factories have been closed throughout the entire period Saturdays and Sundays, and we find we have been able to get just as good service and pay similar and even higher wages than factories working on a 6-day schedule.

It would appear, therefore, that in so far as we are concerned, we are just about nine years ahead of Mr. Ford in his "discovery" of the 5-day working week.

### OFFICE WORK

[Shillady & Stuart (Inc.), New York—Management, January, 1927, pp. 44, 46]

* * * The 5-day week grew on us gradually, but we have been using it for the last two years and are now doing more in a 36¾-hour week than we formerly did in a 42-hour week.

We conduct a social organization service, and our clients are social-welfare organizations exclusively. One of our departments secures between 40,000 and 50,000 gifts each year from our huge list of charitably inclined people.

This calls for a great deal of typewriting, filling in, and other forms of clerical and mechanical work. In this respect our work is very similar to commercial direct mail service.

To the average typist, form-letter work smacks of the sweat shop, but conditions are different with us. Only girls who are capable of earning $20 to $26 a week are selected. The same girls formerly earned $15 to $18 in letter shops, working a 6-day week, with occasional unpaid overtime.

The use of electrically driven typewriters, plus short hours and the 5-day week, takes the fatigue out of their work. They really work two short intensive periods each day. * * *

The 5-day week will become general, just as surely as the 5½-day week did. The use of proper machines, the intensive cultivation and development of efficiency, the adoption of the golden rule between employees and management are all making it possible for us to do more and better work in fewer hours; and when the 6-hour day shows on the horizon those who are organized to secure six hours of real work each day will still find the 5-day week ample.

### PUBLISHING COMPANY

[The Management Review, December, 1926, p. 365]

The Lefax organization has adopted the 5-day week, not as an experiment, as the plan had already been tried for several successive summers with such good results that its extension over the entire year was felt to be justified. No readjustment of wages has been made, each employee receiving the same weekly compensation for five days as was formerly paid for five and a half days.

### OFFICE EQUIPMENT MANUFACTURE

[From Domestic Commerce, U. S. Department of Commerce, January 7, 1929, p. 3]

A large eastern manufacturer of check-writing machinery and adding machines is reported to have placed its 600 employees on the 5-day week plan without reducing wages. Check will be kept on all departments in an effort to bear out the conviction of the company's officers that the longer recreation period will produce more satisfied and efficient workers.

### RADIO EQUIPMENT MANUFACTURE

[The Typographical Journal, Indianapolis, Ind., December, 1926, p. 834]

An example of the success of the 5-day week as it has been carried out for five years without a loss in dividends has been in vogue in the Ravenswood manufacturing district of Chicago. The H. G. Saal Co., which manufactures radio equipment at 1800 Montrose Avenue, began the 5-day week as a demonstrated policy of sound business success. The system, tremendously popular with the employees, explained in the words of the president, Leslie S. Gordon, was, moreover, adopted with "no charity" in mind.

"The secret," said Mr. Gordon, "is not in having the employees work 40 hours. It is in getting 44 hours of work from the employees in five days—giving them all of Saturday off throughout the year. Our method involves nine hours of work on the first four days of the week and eight hours on Friday. The hours are 8 to 5.30 on the first four days and 8 to 4.30 on Friday. Our employees say they are satisfied, because they get home in time for supper every night and Saturdays are free for their own usage. Since the change was not one of the number of work hours production did not decrease; rather a fair-sized margin of increase on the part of the better-rested workers was noticeable in production. Man for man we have noticed better efficiency. We can not give figures on its increase, I regret, because of the ups and downs that we had in our business in changing from phonograph manufacturing to radio-equipment production. We have had more increased efficiency in the summer than in the winter, I should say; more noticeable when the man gets outside in the summer than when he spends his day indoors on his winter Saturdays. The men are so used to the Saturday off that they object now to working six days, even if they make more money. Our company, being swamped with emergency orders, has kept half of the force working on Saturdays during the past month. They don't like it and are kicking. They don't even like more money."

The plan was adopted five years ago when the 400 employees were questioned about having Saturday off. The employees had frequently made demands regarding Saturday off since the company had encouraged outdoor sports and recreation among its workers. The company put the matter to a vote and, with the exception of one department of the company, it was almost a unanimous vote by the employees. The change was made largely so that the employees could go on Saturdays to a recreation and sporting camp, called the H. G. Saal Recreation Club, at Pistake Bay.

## Five-Day Week in Certain Union Trades, by Cities

THE following table gives details regarding the prevalence of the 5-day and 40-hour week in the organized trades covered by the bureau's 1928 survey of union wages and hours. This survey dealt almost solely with time workers.

UNION TRADES IN WHICH THE 5-DAY WEEK OR 40-HOUR-OR-LESS WEEK PREVAILS

| City and trade | Hours of unions working— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 days per week whole of year | | | 5 days per week part of year | | | 6 days but 40 hours or less per week | | |
| | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday |
| *Building trades* | | | | | | | | | |
| Asbestos workers: | | | | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Bricklayers: | | | | | | | | | |
| Baltimore, Md | | | | 8 | (1) | 0 | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Bricklayers, sewer, tunnel, and caisson: | | | | | | | | | |
| Philadelphia, Pa | | | | 8 | (1) | 0 | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Building laborers, mortar mixers: Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Carpenters: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Carpenters—millwrights: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Carpenters—parquetry floor layers: | | | | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Youngstown, Ohio | 8 | 0 | 0 | | | | | | |
| Carpenters—wharf and bridge: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Cement finishers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Scranton, Pa | 8 | 0 | 0 | | | | | | |
| Composition roofers: | | | | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Seattle, Wash. (foremen) | | | | 8 | (2) | 0 | | | |
| Hod carriers: Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Inside wiremen: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Butte, Mont | 8 | 0 | 0 | | | | | | |

[1] 4 hours, September to May, inclusive.
[2] 4 hours, September to April, inclusive.
[3] 4 hours, October to May, inclusive.

UNION TRADES IN WHICH THE 5-DAY WEEK OR 40-HOUR-OR-LESS WEEK PREVAILS—Continued

| City and trade | Hours of unions working— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 days per week whole of year | | | 5 days per week part of year | | | 6 days but 40 hours or less per week | | |
| | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday |
| *Building trades*—Continued | | | | | | | | | |
| Inside wiremen—Continued. | | | | | | | | | |
| Philadelphia, Pa | | | | 8 | (1) | 0 | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Washington, D. C | 8 | 0 | 0 | | | | | | |
| Inside wiremen, fixture hangers: | | | | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Lathers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Baltimore, Md. (piecework) | 8 | 0 | 0 | | | | | | |
| Boston, Mass | 8 | 0 | 0 | | | | | | |
| Boston, Mass (piecework) | 8 | 0 | 0 | | | | | | |
| Buffalo, N. Y | 8 | 0 | 0 | | | | | | |
| Buffalo, N. Y. (piecework) | 8 | 0 | 0 | | | | | | |
| Columbus, Ohio | 8 | 0 | 0 | | | | | | |
| Columbus, Ohio (piecework—softwood) | 8 | 0 | 0 | | | | | | |
| Madison, Wis | 8 | 0 | 0 | | | | | | |
| New York, N. Y. (wood—Union A) | 8 | 0 | 0 | | | | | | |
| New York, N. Y. (piecework—Union A) | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa. (wood) | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa. (metal) | 8 | 0 | 0 | | | | | | |
| Pittsburgh, Pa | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Seattle, Wash. (metal) | 8 | 0 | 0 | | | | | | |
| Seattle, Wash. (wood) | 8 | 0 | 0 | | | | | | |
| Toledo, Ohio | 8 | 0 | 0 | | | | | | |
| Washington, D. C | 8 | 0 | 0 | | | | | | |
| Wichita, Kans | | | | 8 | (4) | 0 | | | |
| Worcester, Mass | 8 | 0 | 0 | | | | | | |
| Worcester, Mass. (piecework) | 8 | 0 | 0 | | | | | | |
| Youngstown, Ohio | 8 | 0 | 0 | | | | | | |
| Marble setters: | | | | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa | | | | 8 | (1) | 0 | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Marble setters' helpers: | | | | | | | | | |
| Philadelphia, Pa | | | | 8 | (1) | 0 | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Mosaic and terrazzo workers: | | | | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Painters: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Boston, Mass | 8 | 0 | 0 | | | | | | |
| Bridgeport, Conn | 8 | 0 | 0 | | | | | | |
| Chicago, Ill | 8 | 0 | 0 | | | | | | |
| Cincinnati, Ohio | 8 | 0 | 0 | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| Newark, N. J | 8 | 0 | 0 | | | | | | |
| New York, N. Y. (Union A) | 8 | 0 | 0 | | | | | | |
| New York, N. Y. (Union B) | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Scranton, Pa | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Springfield, Mass | 8 | 0 | 0 | | | | | | |
| Worcester, Mass | 8 | 0 | 0 | | | | | | |
| Youngstown, Ohio | 8 | 0 | 0 | | | | | | |
| Painters, fresco: | | | | | | | | | |
| Boston, Mass | 8 | 0 | 0 | | | | | | |
| Cincinnati, Ohio | 8 | 0 | 0 | | | | | | |
| New York, N. Y. (Brooklyn) | 8 | 0 | 0 | | | | | | |

[1] 4 hours, September to May, inclusive.
[2] 4 hours, September to April, inclusive.
[4] 4 hours, March to September, inclusive.

UNION TRADES IN WHICH THE 5-DAY WEEK OR 40-HOUR-OR-LESS WEEK PREVAILS—Continued

| City and trade | Hours of unions working— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 days per week whole of year | | | 5 days per week part of year | | | 6 days but 40 hours or less per week | | |
| | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday |
| *Building trades*—Continued | | | | | | | | | |
| Painters, fresco—Continued. | | | | | | | | | |
| Springfield, Mass | 8 | 0 | 0 | | | | | | |
| Worcester, Mass | 8 | 0 | 0 | | | | | | |
| Painters, sign: | | | | | | | | | |
| Chicago, Ill | 8 | 0 | 0 | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| New York, N. Y | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa | 8 | 0 | 0 | | | | | | |
| Toledo, Ohio | 8 | 0 | 0 | | | | | | |
| Worcester, Mass | 8 | 0 | 0 | | | | | | |
| Plasterers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Boston, Mass | 8 | 0 | 0 | | | | | | |
| Buffalo, N. Y | 8 | 0 | 0 | | | | | | |
| Columbus, Ohio | 8 | 0 | 0 | | | | | | |
| Dayton, Ohio | 8 | 0 | 0 | | | | | | |
| Grand Rapids, Mich | 8 | 0 | 0 | | | | | | |
| New York, N. Y | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa | 8 | 0 | 0 | | | | | | |
| Pittsburgh, Pa | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Providence, R. I | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Scranton, Pa | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Spokane, Wash | 8 | 0 | 0 | | | | | | |
| Washington, D. C | 8 | 0 | 0 | | | | | | |
| Youngstown, Ohio | 8 | 0 | 0 | | | | | | |
| Plasterers' laborers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Boston, Mass | 8 | 0 | 0 | | | | | | |
| New York, N. Y | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Plumbers and gas fitters: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Butte, Mont | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Sheet-metal workers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (3) | 0 | | | |
| Youngstown, Ohio | 8 | 0 | 0 | | | | | | |
| Ship carpenters: St. Louis, Mo | 8 | 0 | 0 | | | | | | |
| Slate and tile roofers: Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Steam and sprinkler fitters: | | | | | | | | | |
| Baltimore, Md. (fitters, steam) | 8 | 0 | 0 | | | | | | |
| Butte, Mont | 9 | 0 | 0 | | | | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Steam and sprinkler fitters' helpers: | | | | | | | | | |
| Baltimore, Md. (steam fitters' helpers) | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | 8 | 0 | 0 | | | | | | |
| Stone masons: | | | | | | | | | |
| Baltimore, Md | | | | 8 | (1) | 0 | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa | | | | 8 | (4) | 0 | | | |
| Portland, Oreg | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (3) | 0 | | | |
| Structural-iron workers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Baltimore, Md. (rodman) | 8 | 0 | 0 | | | | | | |
| Baltimore, Md. (finishers) | 8 | 0 | 0 | | | | | | |

[1] 4 hours, September to May, inclusive.
[2] 4 hours, September to April, inclusive.
[3] Some members work 4 hours, September to April.
[4] 4 hours, September to June, inclusive.

UNION TRADES IN WHICH THE 5-DAY WEEK OR 40-HOUR-OR-LESS WEEK PREVAILS—Continued

| City and trade | Hours of unions working— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 days per week whole of year | | | 5 days per week part of year | | | 6 days but 40 hours or less per week | | |
| | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday |
| *Building trades*—Continued | | | | | | | | | |
| Tile layers: | | | | | | | | | |
| Baltimore, Md | 8 | 0 | 0 | | | | | | |
| Denver, Colo | 8 | 0 | 0 | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| Tile layers' helpers: | | | | | | | | | |
| Seattle, Wash | | | | 8 | (2) | 0 | | | |
| *Granite trades* | | | | | | | | | |
| Granite cutters: | | | | | | | | | |
| Buffalo, N. Y | | | | 8 | (7) | 0 | | | |
| Charleston, S. C | 8 | 0 | 0 | | | | | | |
| Chicago, Ill. (building work, outside) | | | | 8 | (8) | 0 | | | |
| Cincinnati, Ohio (inside) | | | | 8 | (8) | 0 | | | |
| Cincinnati, Ohio (machine) | | | | 8 | (8) | 0 | | | |
| Cleveland, Ohio (inside) | | | | 8 | (8) | 0 | | | |
| Cleveland, Ohio (machine) | | | | 8 | (8) | 0 | | | |
| Cleveland, Ohio (outside) | | | | 8 | (8) | 0 | | | |
| Des Moines, Iowa (inside) | | | | 8 | (8) | 0 | | | |
| Des Moines, Iowa (machine) | | | | 8 | (8) | 0 | | | |
| Des Moines, Iowa (outside) | | | | 8 | (8) | 0 | | | |
| Fall River, Mass. (inside) | | | | 8 | (9) | 0 | | | |
| Fall River, Mass. (machine) | | | | 8 | (9) | 0 | | | |
| New Haven, Conn | | | | 8 | (10) | 0 | | | |
| Philadelphia, Pa | | | | 8 | (6) | 0 | | | |
| Providence, R. I. (machine) | | | | 8 | (11) | 0 | | | |
| Providence, R. I | | | | 8 | (11) | 0 | | | |
| Seattle, Wash | | | | 8 | (9) | 0 | | | |
| Toledo, Ohio | | | | 8 | (9) | 0 | | | |
| Toledo, Ohio (machine) | | | | 8 | (8) | 0 | | | |
| *Linemen* | | | | | | | | | |
| Linemen—overhead and underground, Seattle | 8 | 0 | 0 | | | | | | |
| Linemen—cable splicers, Seattle | 8 | 0 | 0 | | | | | | |
| *Printing and publishing—Book and job* | | | | | | | | | |
| Compositors: Philadelphia (German text) | 8 | 0 | 0 | | | | | | |
| Pressmen—cylinder | 9⅗ | 0 | 0 | | | | | | |
| Machine operators: Philadelphia (German text) | 8 | 0 | 0 | | | | | | |
| *Printing and publishing—newspaper* | | | | | | | | | |
| Compositors: | | | | | | | | | |
| Chicago, Ill. (German text) | 8 | 0 | 0 | | | | | | |
| Chicago, Ill. (Hebrew text) | | | | | | | 6 | 6 | 0 |
| Detroit, Mich. (German text) | [12] 8 | 8 | 0 | | | | | | |
| Newark, N. J. (German text) | [12] 8 | 8 | 0 | | | | | | |
| New York, N. Y. (Bohemian text) | | | | | | | 7 | 3½ | 0 |
| New York, N. Y. (German text) | [12] 7½ | 7½ | 0 | | | | | | |
| New York, N. Y. (Hebrew text) | | | | | | | 6 | 6 | 0 |
| New York, N. Y. (Hellenic text) | | | | | | | 7 | 4½ | 0 |
| New York, N. Y. (Italian text) | | | | | | | 6½ | 6½ | 0 |
| Compositors—night work: | | | | | | | | | |
| Chicago, Ill. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| Newark, N. J. (German text) | [12] 8 | 8 | 0 | | | | | | |
| New York, N. Y. (German text) | [12] 7½ | 7½ | 0 | | | | | | |
| New York, N. Y. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| New York, N. Y. (Italian text) | | | | | | | 6 | 6 | 0 |
| Philadelphia, Pa. (German text) | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| St. Louis, Mo. (German text) | [12] 8 | 8 | 0 | | | | | | |

[2] 4 hours, September to April, inclusive.
[6] 4 hours, September to June, inclusive.
[7] 4 hours, April, May, October, and November.
[8] 4 hours, April to October, inclusive.
[9] 4 hours, April to September, inclusive.
[10] 4 hours, March to October, inclusive.
[11] 4 hours, April to June, inclusive.
[12] Work 5 days per week.

UNION TRADES IN WHICH THE 5-DAY WEEK OR 40-HOUR-OR-LESS WEEK PREVAILS—Continued

| City and trade | Hours of unions working— | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 days per week whole of year | | | 5 days per week part of year | | | 6 days but 40 hours or less per week | | |
| | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday | Monday to Friday | Saturday | Sunday |
| *Printing and publishing—newspaper*—Contd. | | | | | | | | | |
| Machine operators—day work: | | | | | | | | | |
| Chicago, Ill. (Bohemian text) | | | | | | | 6 | 6 | 0 |
| Chicago, Ill. (German text) | 8 | 0 | 0 | | | | | | |
| Chicago, Ill. (Hebrew text) | | | | | | | 6 | 6 | 0 |
| Chicago, Ill. (Polish text) | | | | | | | 6½ | 6½ | 0 |
| Dallas, Tex | | | | | | | 6 | 6 | 0 |
| Detroit, Mich. (German text) | [13] 8 | 8 | 0 | | | | | | |
| Newark, N. J. (German text) | [13] 8 | 8 | 0 | | | | | | |
| New York, N. Y. (Bohemian text) | | | | | | | 7 | 3½ | 0 |
| New York, N. Y. (German text) | [12] 7½ | 7½ | 0 | | | | | | |
| New York, N. Y. (Hebrew text) | | | | | | | 6 | 6 | 0 |
| New York, N. Y. (Hellenic text) | | | | | | | 7 | 4½ | 0 |
| New York, N. Y. (Hungarian text) | | | | | | | 6 | 6 | 0 |
| New York, N. Y. (Italian text) | | | | | | | 6½ | 6½ | 0 |
| Philadelphia, Pa. (German text) | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| Providence, R. I | | | | | | | 6½ | 6½ | 0 |
| Machine operators—night work: | | | | | | | | | |
| Chicago, Ill. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| Dallas, Tex | | | | | | | 6 | 6 | 0 |
| Newark, N. J. (German text) | [13] 8 | 8 | 0 | | | | | | |
| New York, N. Y. (German text) | [12] 7½ | 7½ | 0 | | | | | | |
| New York, N. Y. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| New York, N. Y. (Hungarian text) | | | | | | | 6 | 6 | 0 |
| New York, N. Y. (Italian text) | | | | | | | 6 | 6 | 0 |
| Philadelphia, Pa. (German text) | 8 | 0 | 0 | | | | | | |
| Philadelphia, Pa. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| Providence, R. I | | | | | | | 6½ | 6½ | 0 |
| St. Louis, Mo. (German text) | [12] 8 | 8 | 0 | | | | | | |
| Machine tenders—day work: | | | | | | | | | |
| Chicago, Ill. (German text) | 8 | 0 | 0 | | | | | | |
| Chicago, Ill. (Hebrew text) | | | | | | | 6 | 6 | 0 |
| Machine tenders (machinists)—night work: | | | | | | | | | |
| Philadelphia, Pa. (Hebrew text) | | | | | | | 4½ | 4½ | 0 |
| Machinist-operators—day work: Chicago, Ill. (Bohemian text) | | | | | | | 6 | 6 | 0 |
| Photo-engravers—night work: | | | | | | | | | |
| Baltimore, Md | | | | | | | 6⅔ | 6⅔ | 0 |
| Dallas, Tex | | | | | | | 6⅔ | 6⅔ | 0 |
| Des Moines, Iowa | | | | | | | 7 | 5 | 0 |
| Los Angeles, Calif | | | | | | | 6⅔ | 6⅔ | 0 |
| Memphis, Tenn | | | | | | | [13] 6 | 9 | 0 |
| Milwaukee, Wis | | | | | | | [14] 6⅔ | 6⅔ | 0 |
| Newark, N. J | | | | | | | 6⅔ | 6⅔ | 0 |
| New York, N. Y | | | | | | | [14] 6⅔ | 6⅔ | 0 |
| Richmond, Va | | | | | | | 6⅔ | 6⅔ | 0 |
| Rochester, N. Y | | | | | | | 6⅔ | 6⅔ | 0 |
| Springfield, Mass | | | | | | | 6⅔ | 6⅔ | 0 |
| Washington, D. C | | | | | | | 6⅔ | 6⅔ | 0 |
| Pressmen, web—night work: | | | | | | | | | |
| Boston, Mass. (in charge) | | | | | | | 6 | 6 | 0 |
| Boston, Mass. (journeymen) | | | | | | | 6 | 6 | 0 |
| Bridgeport, Conn. (in charge) | | | | | | | 6 | 6 | 0 |
| Bridgeport, Conn. (journeymen) | | | | | | | 6 | 6 | 0 |
| Stereotypers—night work: | | | | | | | | | |
| Boston, Mass | | | | | | | 6 | 6 | 0 |
| Bridgeport, Conn | | | | | | | 6 | 6 | 0 |
| Chicago, Ill. (shops B) | | | | | | | 6 | 6 | 0 |
| Jacksonville, Fla | | | | | | | 6 | 9 | 0 |
| Newark, N. J | | | | | | | 6 | 6 | 0 |
| New Haven, Conn | | | | | | | 6 | 6 | 0 |
| New York, N. Y | | | | | | | 6 | 8 | 0 |

[13] Work 5 nights per week.
[12] Friday 7 hours.
[14] Hours vary but total 40.

## Protection of Railroad Workers Against Removal of Railroad Shops and Terminals

THE most important decision in the United States up to the present time involving the demands of railroad workers for compensation for property loss from depreciation of the value of their homes due to the removal of railroad terminals was rendered in the Texas & Pacific Railway Co. arbitration case, reported to the President by the Third Emergency Arbitration Board on April 20, in which the railroad was held partly liable for this loss to the employees.

Many railroads of the country have during the past several years, in the interests of economy and efficiency, been moving their general shops or terminals to more central or advantageous locations. This makes it necessary for some of the operating employees to move their homes to the new town or city. As many of the employees have purchased homes and permanently established themselves in the original locality the movement often causes hardship to these employees. If the employees are operating employees, they are not particularly fitted for other classes of work and are therefore virtually compelled to move. When a large proportion of the population of a town moves away, it sometimes happens that the property values decline, often causing losses to those who move and immediately sell their homes. The arguments of the parties in this arbitration case, the findings of fact, the existing precedents, and the conclusions of the arbitration board are reviewed below.

### Texas & Pacific Railway Co. Arbitration Case

THE EMERGENCY BOARD appointed on March 30, 1929, under section 10 of the railway labor act of 1926, reported to the President, on April 20, 1929, its findings and conclusions in the dispute between the Texas & Pacific Railway Co. and certain engine and train service employees. The chief cause of the dispute between the carrier and the employees grew out of the claims of the employees for compensation for property losses which the employees suffered as a result of the change in the location of terminals from Longview Junction and Marshall, Tex., to Mineola, Tex. The board found that the loss should be borne equally by the railroad and the employees; that the loss was the depreciation in the market value of the property involved due to the removal of the terminal, the measure of the depreciation to be the difference between the market value of the property before it became known that the terminal would be moved and the market value after removal; and that the principle be confined to the homes of engineers, firemen, conductors, brakemen, and baggagemen who were required by the conditions of the service to move their homes.

The dispute between the Texas & Pacific Railway Co. and certain engine and train service employees not having been adjusted under the provisions of the railway labor act, an emergency board was appointed by the President pursuant to the provisions of the railway labor act in accordance with executive proclamation of March 29, 1929, to investigate and report its findings respecting the dispute. The board met in Dallas, Tex., on April 10, 1929. At the hearings it appeared that the chief cause for the dispute grew out of the claims of the employees for compensation for property losses by reason of

the removal of terminals from Longview Junction and Marshall, Tex., to Mineola, Tex.

At the hearing the employees presented the following arguments to uphold their contention:

1. In a small town, as opposed to a large city, the movement of an industry which supports a large part of the population has immediate and direct effect upon the property values, because it necessitates the removal of technically trained employees out of town, creates unemployment among those employees not moving with the industry, decreases taxes by decreasing the taxable population, decreases the income of business houses, churches, educational, and other organizations, and because of the decrease in property values the technically trained employees of the industry economically forced to move with the industry are forced to lose a part of their capital savings with which they have purchased homes.

2. In considering the removal of its shops from a town, particularly one which is almost entirely dependent upon the existence of railroad shops and terminals in the locality for its economic existence, the railroad should consider more than its private economic savings. The losses to others should be considered. The railroad should at least be responsible for that part of the property loss of its own technically trained employees whom it practically forces to move from their established homes.

3. The technically trained employees of a railroad, such as engineers, firemen, conductors, brakemen, and baggagemen, are not in the same position as general employees, such as clerks and machinists, whose training fits them to accept employment other than railroad employment with less economic loss in wage. The technically trained railroad employees are at a disadvantage as compared with other employees, making it practically necessary for them to move with the railroad shops and terminals, and the railroad should consider them in a class apart from its other employees and share the property loss sustained by such employees in the capital invested in their homes through such removal.

4. In considering the question of the extent that the railroad shall share the property loss of its technically trained employees, only the capital invested in an actual home of the usual and customary size and character used by such employees as homes rather than mere investments should be considered.

5. The United States Government, the Canadian Government, several railroads, and several State legislatures have created precedents in legislation or voluntary action for the demands of the railroad workers.

The railroad contended that it was under no legal or contractual liability, that it was not customary for the railroad to compensate for such loss, and that the weight of precedent was against it.[1]

The board, in its findings, pointed out that the Texas & Pacific Railway Co. had maintained its terminals at Longview Junction and Marshall, Tex., for many years. Longview has a population of from six to seven thousand. The number of train and engine service employees owning homes in Longview affected by the change of terminals is

[1] For the railroad's view of precedents see hearings held at Dallas before the emergency board appointed by the President Mar. 30, 1929, Texas & Pacific Ry. Co. case, pp. 854–857. (Mimeographed.)

about 100. The number of train and engine service employees affected by the change to Mineola is about 225. It appears that if all the train and engine service employees affected by the change moved from Longview to Mineola, Longview would suffer an immediate loss of population of approximately 1,000 persons—possibly 15 per cent of its population. The result of that reduction at one time will, without doubt, seriously depreciate the value of the property owned and occupied by the employees affected. The community is not one in which such a number of vacant houses or properties for sale could be quickly or readily absorbed. The town of Marshall has a population of about 18,000. The number of train and engine service employees affected by the change to Mineola is about 160. The number of such employees owning homes who would be effected by the change of terminals is about 30. Because of the greater population of Marshall and the much smaller per cent of population withdrawn, it is extremely doubtful whether there is any substantial depreciation in property values. It is believed the properties could be readily rented or sold.

In its conclusions the board conceded that the carrier was under no legal nor contractual liability, that the payment of compensation was not a policy generally sanctioned by custom, and that the weight of precedent was against it. The board pointed out that in three instances carriers had paid compensation where the amount involved was not large. In one of these cases the carrier was interested in the town-site company which sold the lots. The board pointed out that the principle had been recognized in an act of Congress and had been definitely adopted in Canada by act of Parliament. (See details as to precedents below.)

In reaching its conclusions requiring the railroad to share the property loss of the employees due to the removal of the terminal, the board reasoned as follows:

> After all the fact that a thing has not often been done is no reason why it should not be done, if it be sound in principle and necessary to meet the demands of justice and fair dealing. Carriers are public-service corporations in the broad meaning of those words. They are subject to governmental regulation and control. The acts of Congress contemplate efficiency of service, fair treatment of employees, and a reasonable return to stockholders. In other words, there is a community of interest between the public, the stockholders, and the employees that must not be overlooked.
>
> The train and engine service employees are in a class by themselves. They must heed the call of the road and move when a terminal is changed, and the character of their employment is such that their opportunities to enter other fields are limited. These men are encouraged to buy their homes. Such ownership strengthens their moral fiber, makes them better citizens, and adds to their efficiency.
>
> The change from Longview Junction to Mineola and from Marshall to Shreveport will result in a substantial saving for the carrier. It is not fair, we think, that the carrier reap the entire benefit and that the employees be compelled to bear the entire loss.
>
> But the question recurs: How shall the loss be apportioned? It is impossible to lay down a rule applicable to every situation. Here the terminals were changed for two purposes: (1) Efficiency; (2) economy. Ordinarily a change made for efficiency is a risk naturally incident to the employment, and in this respect the case for compensation is not so clear. But as before stated, a loss due to a change, made in the interest of economy, should not fall on the employees alone.
>
> We are therefore constrained to the view that in the circumstances here presented the loss should be borne equally by the carrier and the employees. The loss is the depreciation in the market value of the property involved, due solely to the change of terminal and to no other factor. The measure of depreciation

is the difference between the market value of the property just before it became generally known that the terminal would be moved, and the market value immediately after removal.

In announcing this principle we confine its application to the engineers, firemen, conductors, brakemen, and baggagemen here involved, who are required by the conditions of the service to move their homes. It does not apply to employees who leave or are dismissed from the service. We further confine its application to actual homes of the said classes of employees, of the usual and customary size and character in the town of their location. It does not apply to any lots of unusual size or to any property held or used for mere investment. We are further of the opinion that the claims arising in this case should be settled in conference, or in case of disagreement, by arbitration in the following manner: Three competent, disinterested men, none of whom live in Longview or Marshall, shall compose the arbitration board. One of them shall be selected by the carrier and one by the employees affected or their respresentatives. The two thus selected shall select the third. If such selection is not agreed upon within 10 days, the third person shall be selected by the chairman of the United States Board of Mediation.[2]

## Action Taken by Railroad Brotherhoods

SEVERAL instances have arisen in which the employees have objected to the removal of shops and terminals and have attempted to prevent such removal. It has become a problem of interest to the national brotherhoods. The Brotherhood of Locomotive Firemen and Enginemen, at its San Francisco convention in 1928, passed the following resolution: [3]

Whereas, the size of power and equipment in service on modern railroads has curtailed the number of men employed and increased the hazard of employment and the power of production of the men left in service, and

Whereas, for the same reason the railroad managements have moved their home terminals in a great many places on different railroads, thereby causing our membership to move to other and sometimes entirely new towns, and causing us to lose all or most of the values of homes we had established at their former terminals, forcing us to either buy or rent homes in the new locations, which in a great many cases meant sacrifice of our lifetime savings: Therefore, be it

*Resolved*, That this convention authorize our grand lodge officers to make serious effort to have legislation passed compelling railroad companies to pay for the homes thus abolished.

## Voluntary Action of Railroads and Congress

IN 1926 Congress passed an act [4] to repay the excess amount of the purchase price over the price fixed as the result of the reappraisal by the United States Secretary of the Interior of May 11, 1925, to certain persons who had purchased lots in Bowdoin, Mont. The repayment was authorized following the removal of the terminals from the town of Bowdoin.[5]

At least three cases exist [6] in which railroads have paid sums of money to their employees because of loss in property values to the homes caused by the removal of the railroad shops or terminals.

The Erie Railroad, in 1912, moved its terminal from Galion, Ohio, to Marion, Ohio, and compensation was paid to certain employees in its train and engine service for losses sustained.[7]

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[2] Emergency Board appointed Mar. 30, 1929, under Section 10 of the Railway Labor Act, etc., Report [on Texas & Pacific Ry. Co. case]: Washington, 1929.

[3] Hearings held at Dallas before the emergency board appointed by the President Mar. 30, 1929 (Texas & Pacific Ry. Co. case), p. 562. (Mimeographed.)

[4] 44 Stat. 708.

[5] Hearings held at Dallas before the emergency board appointed by the President Mar. 30, 1929 (Texas & Pacific Ry. Co. case), pp. 458, 686, 794. (Mimeographed.)

[6] Idem, p. 661.

[7] Idem, p. 480.

The Kansas City Southern Railway Co., by an agreement made in 1909, provided for the purchase of property of employees following the removal of its terminal away from Menna, Ark.[8]

The Union Pacific Railway Co. abandoned Waumego, Brookville, and Wallace, Kans., and Hugo, Colo., and made payments to employees for property losses.[9]

## Legislation and Decisions of Courts

LEGISLATION has been passed in four States and in Canada on the subject of removal of shops and terminals. These laws may be classified generally into two groups. The first requires the railroad to notify or obtain permission of the State public service commission to remove the shops or terminals before moving them.[10] The second requires the railroads to reimburse their employees for losses due to such removal.[11]

Three States—Texas, Oklahoma, and Wisconsin—have the first type of laws. Texas has had legislation on the general subject since 1889. In that year the office-shops act[12] was passed.[13] This act provides that railroad companies operating railways within the State shall maintain permanently a general office within the State at the place named in the charter and shall maintain their machine shops and roundhouses at such place as they have contracted to keep them. In 1915 an act was passed which provided that no railroad company shall change the location of its general offices, machine shops, or roundhouses save with the consent and approval of the Railroad Commission of Texas.[14] The attempted removal of certain terminals by the Texas & Pacific Railway Co. in 1929 resulted in an opinion by the attorney general of the State to the effect that the statutes did not cover terminals but merely referred to general offices, machine shops, and roundhouses. Following this opinion by the attorney general, the act of 1915[14] was amended to read as follows:[15]

ART. 6286 (6435) (4376). *Change of general offices, etc., prohibited.*—No railroad company shall change the location of its general offices, machine shops, roundhouses, or home terminals, save with the consent and approval of the Railroad Commission of Texas, and this shall apply also to receivers and to purchasers of the franchises and properties of railroad companies and to new corporations formed by such purchasers or their assigns. The commission shall not consent to, or approve of, any removal or change of location in conflict with the restrictions of the first article of this chapter. No consent or approval of the commission shall be required before the return of general offices, machine shops, roundhouses, or home terminals to previous locations, when ordered or required under judgments in suits now pending in trial or appellate court.

Oklahoma passed an act in 1917 prohibiting the removal of railroad shops and division points without the approval of the corporation commission.[16] The act provides as follows:

SECTION 1. That no person, receiver, firm, company, or corporation owning, operating, or managing any line of steam railroad in this State shall be allowed to remove railroad shops or division points which have been located at any place

[8] Idem, pp. 483, 644, 654, 660, 670, 687.
[9] Idem, p. 795.
[10] Texas, Oklahoma, Wisconsin, and Canada.
[11] Montana and Canada.
[12] Acts of 1889, ch. 106; Rev. Civ. Stat. 1925, arts. 6275–6278.
[13] International & G. N. Ry. Co. *v.* Anderson Co., 246 U. S. 424; Central Trust Co. *v.* Anderson County, 268 U. S. 93; Houston & T. C. R. Co. *v.* City of Ennis, 201 S. W. 256, 260.
[14] Acts of 1915, ch. 20; Rev. Civ. Stats., 1925, art. 6286. See also, Acts of 1923, ch. 153.
[15] Acts of 1929, Senate No. 305, signed by the governor Mar. 2, 1929. (Quoted in hearings held at Dallas before the emergency board appointed by the President Mar. 30, 1929 (Texas & Pacific Ry. Co. case).)
[16] Acts of 1917, ch. 225. See, also, Comp. Stats., secs. 3482-3485.

in this State for a period of not less than five years without previously securing the permission of the corporation commission to make such removal.

SEC. 2. If, and when, any such person, receiver, firm, company, or corporation desires to remove any such railroad shops or division point described in section 1 of this act, it shall be his duty to file an application with the corporation commission setting forth the present location of such shops or division point and the reasons for such removal, and thereupon the corporation commission shall have full power and jurisdiction to entertain such complaint, but before hearing the same or making any order permitting such removal to be made, said cause shall be set down for hearing, not less than 10 days' notice shall be given the city, town, or village in which or at which such shops or division point have been maintained and after giving all parties interested a full and complete hearing in the premises the commission may in its discretion permit or refuse such request for a removal.

SEC. 3. When an application is filed before the commission for the removal of terminals or car shops, as provided in section 2, the commission shall hear evidence on the relative efficiency and expense of handling traffic through the proposed terminal as compared with the present facilities, and shall consider all other facts and circumstances affecting the various interests involved. In determining the adequacy of the present facilities the commission shall consider the same increased by an expenditure equal to an amount necessary to remove the same to the proposed location or an amount equal to the necessary expenditure to establish such facilities at the new location. It is hereby further provided that the commission shall hear evidence and shall make a finding of fact as to the sanitary and habitable conditions of the proposed location with reference to whether the same would endanger the health of the employees of the applicant or the health of their families. If the commission should find that the sanitary or habitable conditions at the proposed location of said terminal facilities would endanger or injuriously affect the health of the employees of said applicant or their families, the commission shall deny said application and order the said terminal facilities and car shops to remain at the present location.

SEC. 4. On any such hearing, as provided in this act, the presumption shall be against the removal, and the burden of proof rest upon the applicant to show that such removal ought to be made.

This legislation of Oklahoma resulted in two cases going to the Supreme Court of the United States. On February 19, 1917, the Corporation Commission of Oklahoma issued, upon complaint of citizens of Sapulpa and upon notice to and hearing of the railway, a temporary restraining order enjoining the removal of the shops and division point from Sapulpa to Tulsa. The railway acquiesced in this order and no further action was taken for nearly 10 years. During December, 1926, while the restraining order issued in 1917 was in force, the railway, without leave of the commission and without making any application in the cause, directed that the division point for passenger trains be changed in January, 1927, to Tulsa and it indicated a purpose to remove its shops to West Tulsa. The commission fixed a date on which a hearing was to be held and meanwhile it prohibited the railway from making any change. Whereupon the railway brought suit in the United States District Court for the Northern District of Oklahoma, in which court an interlocutory decree was obtained enjoining the commission from hearing the cause pending before it and from taking any other action therein; from making or enforcing any order restraining the railway from removing its shops and division point from Sapulpa; and specifically from putting into effect a contemplated passenger-train schedule on January 23, 1927, the schedule being intended to facilitate the change of the division point. The decree of the district court did not declare the Oklahoma statute unconstitutional nor did it state any reason why the action enjoined was a violation of the railway's rights nor did it state that there was any danger of irreparable loss.

The case was appealed to the Supreme Court of the United States where the decision of the district court was reversed on May 31, 1927. (Lawrence et al. *v.* St. Louis-San Francisco Railway Co., 274 U. S. 588.) The court did not determine whether the Oklahoma act was obnoxious to the Federal Constitution. Mr. Justic Brandeis, speaking for the court, said, however, that the interlocutory decree of the district court set the railway free to remove the shop before the case could be heard in final hearing and relieved the railway from any duty to obey the restraining order of the commission. Among other things the court said:

> By ending the status quo which had existed for 10 years, it exposed the city and its citizens to danger of irreparable loss. The change subjected Sapulpa to grave and immediate peril. Removal of the shops, which had been located in Sapulpa for a generation, would probably affect property values seriously, and might bring disaster in its train. It might ruin businesses. It might result in unemployment. It might compel many of Sapulpa's citizens to seek homes elsewhere. On application for an interlocutory injunction such considerations are of weight.
>
> The railway asserts that the removal would result in an improved service and in economy in operation. If this appeared to be true, it was the duty of the commission, under the Oklahoma law, to authorize the removal, unless thereby the health of the employees of the railway or of their families was imperiled. It is not to be assumed that the railway proposed to remove the shops to an unhealthy location. And it may not be assumed that the commission would have disregarded its duty.

The court pointed out that the decree disregarded the requirement of section 19 of the act of October 15, 1914 (38 Stat. 730, 738): "That every order of injunction * * * shall set forth the reasons for the issuance of the same, shall be specific in terms * * *," and therefore reversed the decree.

Following this decision Lawrence and others applied to the United States district court for an order requiring the railroad to restore the conditions with respect to its shops and division point existing prior to the issue of the injunction. The district court denied this motion and issued an order that the railroad company apply to the corporation commission of the State to dissolve the restraining orders theretofore made by it restraining removal of shops and division point and to ratify the removal which had been effected. Lawrence and others objected to any consideration of the case before the commission unless and until the railroad should have returned its shops and division point to Sapulpa. The commission ruled in favor of Lawrence. The case then went to final hearing in the United States district court. The district court permanently enjoined the members of the corporation commission of the State of Oklahoma from taking proceedings to prevent the railway company from removing its shops and division point.

The case was again taken to the Supreme Court of the United States, which held that the United States district court, when it issued the preliminary injunction had jurisdiction of the parties and of the subject matter and that it never relinquished its jurisdiction, and that though the Supreme Court in its previous decision had held that the interlocutory decree was improvidently granted it did not declare that the decree was void. The court said that the reasons for not requiring restitution before final hearings were persuasive. "It appears that there was nothing in the new location which could in any wise affect injuriously the health of the railway's employees. The location of the shops at West Tulsa and the vicinity in which

employees may live are sanitary." The removal had cost a large sum, had resulted in savings, had improved railway service and it would cost a large sum to restore the shops and division point to Sapulpa. The court said that it had no occasion to pass upon the constitutionality of the act, but assuming the Oklahoma statute to be valid, "an order of the commission denying leave to remove would, on these facts, clearly have violated the commerce clause. The commission's refusal to hear the application was tantamount to such an order. The railway was not in contempt. The terms of the restraining order had been superseded by the interlocutory injunction. To refuse to hear the application, which the district court had directed the railway to make, was an attempt to inflict punishment for an innocent action." [17]

The Legislature of Wisconsin, in 1925, passed an act relating to the removal of railroad terminals and shops which provided as follows: [18]

SECTION 1. A new section is added to the statutes to read: 192.81 (1) The word "terminal" as employed in this section shall mean where trains are customarily and normally made up or where train and engine crews on through trains are normally and customarily changed on the main line of any steam railroad operating in this State.

(2) The term "shops" shall mean and embrace plants and locations where steam railroads engage in the general work of repairing, painting, overhauling or constructing locomotives, cars, coaches and other rolling stock, and appurtenances thereto.

(3) No railroad company operating in this State shall remove its shops from the place where the same are now located to any other point within or without this State where such removal will involve an expense, cost, or outlay to the railroad company in excess of $50,000 without first having secured the consent and permission of the Railroad Commission of Wisconsin for such removal, after due notice and public hearing, and in all other respects as provided for hearings in sections 195.01 to 195.54, inclusive.

(4) No railroad company operating in this State shall remove or transfer its terminals without the permission or consent of the railroad commission of Wisconsin after due hearing had on petition therefor, in compliance with the provisions of sections 195.01 to 195.54, inclusive, where such removal or transfer of terminals shall involve an expense, cost or outlay to the railroad company in excess of $10,000.

(5) Before any railroad company operating in this State shall make any removal or transfer of shops or terminals it shall file notice of intention so to do with the railroad commission, and the railroad commission shall have power to investigate whether or not the expense of such removal or transfer is in excess of the amounts specified in subsections (3) and (4), as the case may be, and the commission may, in its discretion, direct that no such removal or transfer shall be made during such investigation.

The Legislature of Montana, in 1921, passed an act of the second type of legislation requiring the railroad companies to reimburse the employees for property losses sustained by moving terminals or division points.[19] The act provides as follows:

SECTION 1. That when any railroad or railway company operating its line of road in, into, or through, the State of Montana, shall move any of its division points or terminals, it shall be liable to any employee of such railroad or railway company for any damage sustained by such employee by reason of any decrease in value of any real property actually occupied by such employee as his place of residence, which decrease in value shall be caused by reason of the removal of such division point or terminal, provided such employee shall have in such property so damaged, an estate of freehold. Such damages shall be collectible in any court of competent jurisdiction.

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[17] Lawrence *v.* St. L.-S. F. Ry., 278 U. S. 228, decided Jan. 2, 1929.
[18] Acts of 1925, ch. 312. See, also, Wisconsin Stats., sec. 192.81
[19] Acts of 1921, ch. 159.

SEC. 2. *Provided*, That when any railroad or railway company in good faith determines upon a change or removal of any division point or terminal, and in good faith posts prominently about its station house, shops and yards, a statement of its intention so to do, in such manner as to give reasonable notice thereof to such employee, it shall not be liable as hereinbefore provided for any decrease in value of any interest in any property purchased after the time of such posting, provided that such division point or terminal shall be changed or removed within six months after the date of such posting.

The legislature of Canada, in 1919, passed an act providing for the notification and the approval of the Board of Railway Commissioners of Canada to any removal of shops or terminals and the payment of compensation to employees for financial loss caused to them by change of residence necessitated by such removal.[20] The relevant provisions of the act are as follows:

178. If any deviation, change, or alteration is required by the company to be made in the railway, or any portion thereof, as already constructed, or as merely located and sanctioned, a plan, profile, and book of reference of the portion of such railway proposed to be changed, showing the deviation, change, or alteration proposed to be made, shall, in like manner as hereinbefore provided with respect to the original plan, profile, and book of reference, be submitted for the approval of the board and may be sanctioned by the board.

2. The plan, profile, and book of reference of the portion of such railway so proposed to be changed shall, when so sanctioned, be deposited and dealt with as hereinbefore provided with respect to such original plan, profile, and book of reference.

3. The company may thereupon make such deviation, change, or alteration, and all the provisions of this act shall apply to the portion of such line of railway, at any time so changed or proposed to be changed, in the same manner as they apply to the original line.

4. The board may, either by general regulation or in any particular case, exempt the company from submitting the plan, profile, and book of reference, as in this section provided, where such deviation, change, or alteration is made, or to be made, for the purpose of lessening a curve, reducing a gradient, or otherwise benefiting the railway, or for any other purpose of public advantage as may seem to the board expedient, if such deviation, change, or alteration does not exceed 300 feet from the center line of the railway, located or constructed in accordance with the plans, profiles, and books of reference deposited with the board under this act.

5. Nothing in this section shall be taken to authorize any extension of the railway beyond the termini mentioned in the special act. (1919, ch. 68, sec. 178.)

179. The company shall not, at any time, make any change, alteration, or deviation in the railway, or any portion thereof, until the provisions of the last preceding section are fully complied with, nor remove, close, or abandon any station or divisional point nor create a new divisional point, which would involve the removal of employees, without leave of the board; and where any such change is made the company shall compensate its employees as the board deems proper for any financial loss caused to them by change of residence necessitated thereby. (1919, ch. 68, sec. 179.)

Under the Canadian act at least one order (No. 33402) has been made by the Board of Railway Commissioners for Canada ordering payment of financial loss to employees because of the removal of the employees from Lucerne to Jasper, Alberta, Canada, to be paid by the Canadian National Railway Co.

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[20] Acts of 1919, ch. 68, secs. 178, 179; Rev. Stats. 1927, ch. 170, secs. 178, 179.

# RADIUM POISONING

## Industrial Poisoning from Radioactive Substances

THE Bureau of Labor Statistics has just completed a study of the effects upon the health of workers of the use of radioactive substances, especially in the luminous dial painting industry. The report of this study which is given in the following article contains certain recommendations as to the precautions which are regarded as necessary to be taken by persons engaged in the manufacture, handling, or use of these materials. These recommendations should be considered as minimum requirements in case the use of luminous paint is to be continued. It is, however, strongly contended that the use of luminous dials on watches and clocks is a fad and without economic value. As a fad it may have, of course, certain commercial advantage in extracting from the buying public more money for a watch or clock than that watch or clock is intrinsically worth. It must be said for the American manufacturers that enough of them to represent a large percentage of the total production have signified their willingness to stop the business entirely provided that all will agree to stop and that the importation of luminous dials and watches can be prohibited. The trail of death—and death of the most horrible kind—that this industry has made would suggest that such importation might well be prohibited at once and then a mutual agreement for its abolition be secured in the United States.

The argument that the only dial painters who have died or become affected so far have been those who put the brushes in their mouths is answered by the fact that other methods have not been in use long enough to enable us to say whether or not they will be followed by the same results. Certainly the chemists and laboratory assistants in this industry who have died from radium poisoning have not dipped the brushes in their mouths. They have, it is true, been in contact with larger quantities of the material and have been subject to the effects of greater radiation, but here the difference is simply one of degree. It is impossible to say what the effect of radiation will be, provided all of the minimum requirements recommended below are fulfilled. The investigation has proved that luminous dial painting is deadly under the old methods of operation. The newer methods, even where they have been installed, have not had time to prove whether or not they are less deadly. As it stands, each establishment is adopting its own method of protection. There is no uniformity and there is no agreement among manufacturers as to what is safe or whether or not any method is safe. The subtle action of this material and the length of time required to plant its deadly seeds in the human system are such that the only method of safety which will convince everybody is to abolish the industry entirely.

Purposely, the Bureau of Labor Statistics has avoided any investigation or comments upon the production of radium for therapeutic purposes. It is suggested, however, that in view of the proved cumulative effects of radium used industrially in infinitely small quantities,

the possible ill effects of the use of relatively large amounts in the cure or removal of cancers should be studied by medical organizations.

The effects of radium upon physicians and nurses which are now sufficiently recognized and quite generally guarded against and the recognition of the hazard of its industrial use lead to the question as to whether the possible ill effects upon the patient have received proper consideration. Since radium has proved itself such a dangerous material in these fields, it would seem to have invited close scrutiny of its use in all fields.

ETHELBERT STEWART,
*Commissioner of Labor Statistics.*

## Survey of Industrial Poisoning from Radioactive Substances

DURING the past few years public attention has been forcibly directed to the industrial use of radioactive materials in the United States because of a number of fatalities resulting from it, or attributed to it, and the definite discovery of a previously unknown occupational disease—poisoning from radioactive substances, commonly called radium poisoning.

A partial survey was made in 1925 by the Bureau of Labor Statistics of establishments engaged in the manufacture or the industrial use of radioactive materials. A summary of the observations and of studies by other agencies was published later in the Labor Review.[1]

At the time of the survey all of the known cases had appeared in a single establishment, located in New Jersey, but similar cases were subsequently discovered in other localities, prompting the bureau to undertake another survey, covering all establishments of any importance engaged in dial painting and other establishments engaged in the commercial manufacture of radioactive preparations. While a far greater amount of radioactive substances is handled for therapeutic purposes than for industrial purposes, the majority of that work is performed in hospitals under medical supervision, and the therapeutic phase was therefore not considered in the survey except so far as the commercial industrial preparation was considered. The main purpose of the survey was to examine the changes said to have been made in the different establishments for the protection of the workers, and to ascertain the number of cases apparently attributable to poisoning from the radioactive materials.

Inspections were made of 31 establishments, in which 253 workers were directly subjected to possible harmful exposure to radioactive substances of various degrees of strength. A total of 23 fatalities and 19 living cases were discovered, which were apparently the result of poisoning from the radioactive materials. Fourteen of the fatal cases and eight of the living cases have been diagnosed as cases of radium poisoning; seven of the fatal cases and five of the living cases were undoubtedly caused by it, though diagnosed otherwise; and it is strongly suspected in the other two fatal and six living cases. Aside from the cases recorded, nine were found that show possible connection with exposure to radium, especially four of these in which the persons were found to be radioactive when tested with electroscopes.

[1] See Labor Review, May, 1926.

### Luminous Dial Painting

THE LARGEST number of the suspected fatal and living cases were among the dial painters, totaling 33, all females. Their period of service in the work ranged from 14½ months to more than 12 years. In each case brushes were used for applying the luminous paint to the dials, and were pointed between the lips of the operator, at least until this custom was prohibited in 1925. There seems to be no doubt that the poisoning among these workers was the direct result of this practice. Some of the fine insoluble particles of radioactive substance would naturally be deposited in the mouth each time the brush was pointed, and at least part of them would subsequently be absorbed by the system, eventually causing the pathological condition observed in the affected persons.

### Reduction of Hazards

The employers claim that the precautions adopted since the dangers became known have eliminated the hazard in the dial-painting industry. The most important of these measures forbade the operators from pointing the brushes in the mouths. Later, other implements for applying the composition were provided—glass pens, hardwood sticks, or metal points being substituted for brushes in some establishments, though brushes are still used in several for retouching or correcting the work.

Mechanical application was also introduced in the larger establishments, including both printing and dusting processes. Ordinary printing was attempted, but did not prove successful, as the pressure required smashed the crystals of the composition and destroyed the luminosity. The transfer process, in which a steel die-stamping press with a resilient transfer pad is used, eliminated that difficulty and also the danger of personal contact of the operator with the materials. The luminous composition is mixed with adhesives before it is turned over to the operators, and requires only occasional thinning to keep it at proper consistency. A quantity of composition is placed on a glass slab and the thinner is introduced by means of a small spatula, which is also used for filling the depressions in the steel die with the composition. This method was found to be in use for standard style dials in two of the establishments. but hand application was still necessary for the special styles.

In the dusting process the figures on the dials are first given a coating of enamel or of zinc sulphide mixed with varnish. Before this dries the dials are covered with luminous composition in dry form, and the superfluous composition is removed with a soft brush. Direct contact of the material with the mouths of the operators is consequently avoided, but a considerable amount of the fine dust is distributed in the air, settling on the hands of the operators and probably also being inhaled to a certain extent. In two of the establishments where the work was performed inside a glass-paneled box with open ends, the dial was inserted through one end—in one establishment directly in the hand of the operator and in the other establishment on the end of a long metal holder. The other hand was inserted through the other opening to manipulate the brushes for applying the luminous composition or for removing the excess paint. In the establishment in which the metal holder was employed, rubber finger cots were used on the hand holding the brush. In a third establishment the dusting

process was performed automatically in practically air-tight dust chambers, requiring only the insertion of the dials, fastened on a long metal holder, and their removal after they had been dusted. Each chamber was provided with revolving brushes and with an exhaust, piped out of building but with an arrangement to prevent the loss of the dust. So far as could be seen, no dust escaped from the dusting chambers into the room during the operation.

Other safety measures had been adopted in different establishments, though not all in every place, such as: Prohibiting eating of any kind in the workrooms; rinsing application implements in water and wiping them on a cloth, a chamois, or a rubber sponge; pen racks for implements; lead holders for the mixing crucibles, lead-covered workbenches and lead containers for large quantities of luminous composition; supplying composition in moist form to operators; weighing and moistening of composition under a hood, with suction attachment; rotation of workers in the occupation of weigher; limitation of period of employment in this department; wearing of smocks during work; wearing of rubber gloves when washing containers; and last, but not least, periodical examination of the workers, including blood tests and also electroscopic tests for radioactivity.

Some dial painting is performed in Federal establishments, mostly on instrument dials and gauges. When the dangers in that work became apparent in other places, precautions were taken to safeguard the workers. The following instructions were issued by the Bureau of Aeronautics of the United States Navy Department:

1. All personnel employed in repainting the luminous symbols of instrument dials, or other work requiring the use of radium luminous paint, will be instructed in and required to observe the precautions necessary for reducing the chances of harmful effects from this material.

2. These precautions, as promulgated by the Bureau of Medicine and Surgery, are quoted below:

"Radioactive materials are considered poisonous because if an individual is exposed to high concentrations for long periods of time, there will result disease processes which may become fatal.

"The effect upon the body is principally a lowering of resistance to infection by a change in the relative percentage of white corpuscles in the blood and bone marrow. Persons with poorly preserved teeth and sufferers of chronic constipation are particularly subject to the harmful effects of radioactive substances.

"Exposure is principally through the mouth by swallowing and the inhalation of gases highly laden with the particles. In the concentrations used in the preparations of luminous dials, where only small portions are placed close to the handlers, there is little danger of deleterious effect from direct exposure.

"The following instructions are suggested as reducing the chances of harmful effects:

"(*a*) Only persons free from diseased teeth and free from chronic constipation should engage in the handling of the material.

"(*b*) Daily handling should not extend over a period of more than three months when the worker should be assigned other work for an equally long period.

"(*c*) Handlers should scrupulosuly avoid:

"(1) Pointing brushes with the lips.

"(2) Touching the face or food with soiled hands.

"(3) Touching the radioactive substances except by instruments.

"(*d*) Handling should be conducted in well-ventilated and well-lighted rooms.

"(*e*) Handlers should be frequently examined, particularly for:

"(1) Leucopenia (particularly actual reduction in the number of neutrophiles).

"(2) Lowered blood pressure.

"(3) Anemia, with high color index.

"(4) General physical examination and careful dental examination."

NOTE.—Electroscopic examination is the most positive method of determining the presence of radioactive materials in the body.

At the time of going to press the United States Navy Department has entirely suspended the use of luminous paints at two of its principal places and is conducting an investigation of its own at all other points where the material is being used, with a view to determining whether or not it shall entirely abolish such use.

### Remaining Hazards

The safety measures adopted have apparently improved conditions, but it is questionable if they assure the complete elimination of all hazards in dial painting. Considerable progress has been made during the last few years in the study of the effect of radioactive substances, but the fact remains that the potentiality for harm of these substances is still an unknown quantity. No one knows how small an amount may prove toxic when absorbed in the system, nor does anyone know how small an amount of radiation from the materials may prove injurious to the body, through the constant bombardment of the rays from the materials.

The properties of radium and mesothorium, so far as these are known to science, have been described fully in the articles previously referred to and in others, especially in the article by Doctor Martland in recent issues of The Journal of the American Medical Association.[2] Some time elapsed after the discovery of the Röntgen ray, commonly called X ray, before it was realized that dangers existed in exposure to it unless adequate protection was used. The same thing occurred in the case of radioactive substances. The main reason was that the effects were not visible at once, but were often delayed for long periods. Consequently, scientists scoffed at any possible danger, and even after the results from heavy exposures were known, the possible effect of minute quantities, such as those contained in luminous radioactive composition, was disregarded. The cumulative quality of the material, when ingested, has finally been acknowledged, but the cumulative effect of exposure to radiations has apparently been lost sight of in connection with small quantities.

A certain amount of radiation is continually emitted by radioactive substances. Consequently, there is a constant radiation present in the dial-painting establishments under the methods used now. It can not be seen, and it can not be felt, but it is there. The amount can be determined only by electroscopic test. In one of the establishments visited it was stated that each dial painter was subject to an exposure of 15 micrograms of the radium element for 7 hours per day, 6 days per week. But even when the amount has been determined, the question arises: How large an exposure can a person stand, day after day throughout the year, without serious injury to the system? It is known that heavy exposures will produce changes in the blood, anemia or leukemia which is sometimes fatal, and sterility. In lesser degrees of exposure, even if the results are not more serious, the resistance of the body will be reduced, so that it is more susceptible to ordinary diseases.

Laboratory workers, who handle radioactive salts of high strength, are protected with heavy lead screens from the intense radiations,

[2] Journal of the American Medical Association, issues of Feb. 9 and 16, 1929: "Occupational poisoning in manufacture of luminous watch dials," by Harrison S. Martland, M. D., Newark, N. J. (Reproduced on pp. 62–95 of this issue.)

and handle the sealed containers with tongs. As a rule they do not remain in the vicinity of the radioactive preparations longer than necessary, and work intermittently (having short hours and short weeks and being given vacation periods) in order to break the cumulative effect of the radiations.

Dial painters, of course, differ radically from laboratory workers in handling only comparatively minute quantities, but they work without protective screening, with materials that emit radiations, and in an atmosphere charged with radiations from material handled by coworkers. The amounts of radiation may possibly be too small to affect them, but who knows whether this is so? The mechanical processes introduced increase the potential dangers, as the amount of composition handled daily per operator is practically double the amount handled per hand painter, consequently doubling the exposure. This view is shared by at least one of the larger dial-painting establishments, which decided for that reason that it was safer to continue the hand application.

Another possible factor is the emanation, which is constantly liberated from the unsealed luminous composition through the chemical changes in the radioactive substances. This adds further radiations to those emitted by the composition itself, and also permeates the atmosphere, so that minor quantities are continually inhaled by the workers especially in small and poorly ventilated rooms.

The human element must, as usual, also be considered. In spite of orders from employers and the publicity given by the newspapers to some of the cases, all of the dial painters were not careful in their methods. In some establishments they were seen pointing the brushes between their fingers, leaving deposits of composition which might possibly be conveyed to the mouth. In others, more or less material was splashed on the fingers while mixing the dry composition with adhesives or when adding the thinner, another possible source of contact. Deposits were also seen on fingers from using implements of insufficient length, which became smeared with material. The hands were not always cleansed thoroughly in washing, and at times material was spattered on clothing. One of the worst practices seen was in removing old, deteriorated composition from the countersunk marks and figures on instrument dials. This was scraped out with sharp metal points, and many of the tiny fragments were distributed through the air and scattered over the operators in the process. Though the luminosity has disappeared, this means merely that the sulphide of zinc has deteriorated. The radioactive substances are still present in the material, and just as much care should be exercised in avoiding contact with it as with new composition.

The United States War Department has recognized the personal element hazard by withdrawing authorization for application sets, previously issued to ordnance officers in the field service for renewing the luminous sighting lines on trench mortars, and directing that all sets now in service be turned in for arsenal use only. The orders state that radium luminous paint is poisonous, so during peace time it will be used in the repair of fire-control and sighting instruments only at established arsenals, where proper supervision can be maintained and necessary safeguards enforced.

## Conclusions

While the employers feel that everything possible has been done to make luminous dial painting a safe occupation, it seems that the present safeguards are not adequate in view of the problems involved. The determination of existing hazards is, of course, extremely difficult on account of the insidious action of radioactive substances, as seen in the cases of the affected dial workers. In these workers the effects of the exposure appeared suddenly after considerable time (sometimes several years) had passed without any ill effects of the employment having been noticed. This is shown by the following table, which gives the approximate time of appearance of the illness after the date first employed in the work, for both the fatal and the living cases discovered.

TABLE 1.—DISTRIBUTION OF FATAL AND LIVING CASES OF RADIUM POISONING, BY YEARLY PERIODS BETWEEN BEGINNING OF EMPLOYMENT AND APPEARANCE OF DISEASE IN DIAL PAINTERS

| Cases | Interval between beginning of employment and appearance of disease | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2 and under 3 years | 3 and under 4 years | 4 and under 5 years | 5 and under 6 years | 6 and under 7 years | 8 and under 9 years | 9 and under 10 years | 10 years and over |
| Fatal | 1 | 5 | 4 | 1 | 1 | ---- | 3 | ---- |
| Living | 1 | 1 | 1 | 4 | 4 | 4 | ---- | 3 |
| Total | 2 | 6 | 5 | 5 | 5 | 4 | 3 | 3 |

In some of the cases no symptoms occurred until three to nine years after the cessation of work. It is known now that the old methods were dangerous, although until the delayed effects became apparent they were not thought to be so. All of the affected dial painters were accustomed to point the brushes in their mouths and a majority of those who paint dials at the present time followed the same practice until it was prohibited, four years or less ago. The earliest notice observed during the survey, forbidding tipping of brushes between the lips, was dated June 2, 1925. The rule was said to have been put into effect on December 10, 1924, in one establishment, and not until some time in 1926 in another establishment.

In view of the delay in the appearance of symptoms there is a question whether the new methods are not dangerous also, and whether sufficient time has passed to be sure that all who started to paint luminous dials since the former method was abolished and who have never put brushes in their mouths will not be affected in some manner, especially in blood condition or in reproductive powers.

In the cases brought to light so far, it was found that the radioactive substances were actually deposited in the system through pointing the brushes in the mouths. But it has not been conclusively proved whether the results were mainly from accumulation beyond certain quantities, limited supposedly by individual susceptibility, or, as has also been asserted, by the chemical changes constantly taking place in radioactive substances, through which an extrahazardous state of the element might be developed. Such questions can be determined only through proper scientific tests and research.

Some autnorities blamed the trouble upon mesothorium, which was the radioactive element of the luminous composition used in part of the establishments. This view, whether correct or not, resulted in completely stopping the use of mesothorium for that purpose. It does not appear that there was much difference between the luminous composition containing mesothorium and that containing radium. Both elements have the same chemical composition. Both will destroy tissues and bones, affect the blood, and cause sterility. Mesothorium is by actual weight far stronger in radioactivity than radium, and the theory that it is, therefore, more dangerous might be very reasonable if a similar quantity by weight was used for the luminous composition. Mesothorium is, however, measured by the amount of gamma radiation expelled from it, as compared with the gamma radiation from radium. Consequently the radioactive strength of luminous composition of a certain quality would be practically the same whether radium or mesothorium is used for it.

The main difference in the two elements is the comparatively rapid decay of mesothorium, which would lead to the belief that of the two it would be preferable to have the mesothorium in the system. Mesothorium is, through its own chemical action, reduced to half strength in 6.7 years, the balance is again reduced one-half in the next 6.7 years, and so on. For that reason there appears a possibility of overcoming the effects, if the system can withstand the early action. As reduction to half strength in the case of radium requires 1,580 years, the detrimental effects would continue practically undiminished for an entire lifetime, apparently a more dangerous condition.

Information obtained during the survey developed, however, that some of the affected dial painters had not worked with composition containing mesothorium, and also that electroscopic tests of the workers had failed to show mesothorium present in all cases, even though it had been used in the luminous composition.

It seems strange that suspected cases of poisoning were found only among employees from four establishments, and principally among those from one establishment, now closed down as a result. This establishment, which was probably the earliest one in the United States to produce luminated dials commercially, began operations in 1913. While it was moved twice, it remained in the same general locality and the workers, who were drawn from the vicinity, were employed for comparatively long periods. Those afflicted, for instance, all worked at least 1½ years and some more than 10 years. Five other establishments started shortly afterwards, but were operated on a small scale and no cases were found among employees in these plants. The probable reason that no cases developed in the smaller plants is the fact that while a gum arabic and water adhesive was used in the larger plant, as the luminous composition was applied to paper dials there, an oil-varnish adhesive was used in the five plants, where metal, porcelain or enamel dials were painted. Water has a tendency to separate the hairs of a brush, so that frequent pointing between the lips would be necessary, and it is also not so objectionable in the mouth as the oil-varnish adhesive. In using the latter, the brush would also retain its shape better. This is only

a theory, but it seems to be supported by the presence of cases in establishments using water adhesive, while none were found where oil adhesive was used exclusively.

The above, together with the use of the stylus instead of the brush, may also be the reason why no similar cases have been reported from Europe. Although luminous dial painting has been practiced for a number of years in Switzerland and Germany, reports from officials of those countries to the New Jersey Department of Labor state that no illness has been discovered from it. Blood changes were found in 1925 in one of the workers engaged in luminous dial painting in England, but a recent letter from John C. Bridge, Senior Medical Inspector of Factories, to this bureau states that this worker has since left the industry and married, and that a blood examination showed a normal condition.

Since, in the known cases, the disease did not appear for a considerable length of time, there is no way to ascertain how many of the workers, who had left their employment and perhaps moved to other localities, may have been affected. The symptoms were not specific, often resembling those of other diseases, and might easily be diagnosed according to the most prominent features. The disease is rare, and consultations with physicians proved that many of them were not familiar with it.

The luminous dial painting industry is of relatively small importance when compared with other industries of the United States. It has advanced considerably since the first luminated dials were produced here, about 1913. In 1913 the production of radium dial watches was 8,500, and in 1919 the output had risen to 2,200,000, according to the Engineering and Mining Journal of April 10, 1920, which also gave the importation in 1919 as 560,000 timepieces. Later production or importation figures have not been available. The growth of the industry during recent years was, however, illustrated in two establishments visited in 1925, and again in the recent survey. In one of them the production had increased from 4,200 luminated dials per day to 5,500 per day, an increase of 31 per cent. In the other the number of dial painters had increased from 5 operators in 1925 to 19 four years later, or 280 per cent.

There has, of course, been considerable labor turnover during the 16 years the industry has existed in the United States, but it is estimated that not more than 2,000 individuals in all have been engaged in the work. All establishments of any importance at the present time were visited during the survey, the personnel of these plants totaling 200. Some application work is being done by individuals in various cities, mostly intermittent repair work, and these will probably not exceed 50 in all, making a total of 250 persons employed in the entire industry at the present time. Based on those figures the 15 dead and 18 living cases of poisoning look appalling, especially when it is remembered that the first known death occurred in 1922.

Luminated clocks, watches, pendants, house numbers, push-buttons, and other articles are not necessaries, but serve certain purposes and apparently have caught the public fancy.

All of the firms operating dial-painting establishments expressed themselves as being anxious to adopt any recommendations which might be made, and as willing to abolish the work if the dangers to

the operators can not be avoided. Two of the larger firms have stated that they are ready to discontinue it, regardless of further research, if the other firms will do likewise and the importation of luminated articles can be prohibited.

The main drawback to a unanimous agreement of the manufacturers to abolish the industry lies, of course, in the financial aspect of the situation. An ordinary alarm clock with a luminated dial retails at a higher price than the same article with a plain dial. A luminated dial on a watch likewise increases the price for the same grade. The manufacturer naturally receives part of this additional selling price, and the amount he receives above the additional cost for lumination not only represents a profit on the transaction, but also means disposal of a higher-priced article instead, and an increase in the total selling price for the output of the factory. Under existing conditions abolition of this work in the United States would mean simply that luminated watches and clocks manufactured in foreign countries would be imported as substitutes. These would be purchased by individuals preferring such styles, regardless of whether they are necessary or not, and consequently manufacturers in this country would face a heavy reduction in sales.

The greatest usefulness for luminated dials is on instrument boards for aeroplanes and submarines. According to officers of the United States War Department and Navy Department, they are not absolutely necessary even there, as illumination for the instrument boards could be provided from the motor or from storage batteries. It was pointed out that if the motor stopped no dials were needed. They are also not necessary during peace time for sighting lines on trench mortars, which require one gram apiece. Orders have recently been issued to use for that purpose a nonradioactive luminous paint, which is rendered luminous for a short period by exposure to daylight or strong artificial light. Large dials with heavy markings, formerly luminated, are now also being finished with black enamel background and white enamel markings, claimed to be sufficiently visible at dusk. The only instruments for which radium luminous dials were declared to be indispensable at all times were small field compasses, carried in the hand while traversing the country after dark. In war time, it was stated, the radium luminous dials are essential, regardless of sacrifice involved.

### Recommendations

If luminous dial painting is continued, special precautionary measures should be adopted to protect the workers against the insidious effects of radioactive substances. The following recommendations are based on observations and study of conditions during the survey. Part of these protective measures are in effect in some of the establishments and part of them in others, but in no case, even in the best regulated establishments, have all of the regulations been adopted. While these measures may seem drastic, all of them are considered to be necessary for all establishments engaged in the production of luminated articles, in order to avoid as far as possible the continued danger to the workers.

A rigid physical examination should be made of all prospective workers, to insure their fitness for the occupation. No applicant should be considered who does not come up to a reasonable standard

or who has a previous history of or tendency to such diseases as anemia, cancer, rheumatism, or tuberculosis. Hiring of persons with abnormal physique should also be avoided.

After employment thorough physical examinations should be made at least every two months, including blood counts, electroscopic tests for radioactivity, examination of teeth, and observation of catamenia. Any employee who shows the least sign of injury should immediately be transferred to other duties, away from radioactive substances.

Continuous employment with radioactive materials should be limited to two years, and return to similar work should not be permitted until after an absence of at least the same length of time.

The individual workday should be limited to eight hours at the most, with a lunch period of one hour. During the lunch period all workers should be compelled to leave the workrooms. It would be advisable to reduce the daily limit to seven hours and the weekly limit to fewer than six days.

All workers should be fully instructed in the possible dangers from radioactive substances, so that they will be able to cooperate in preventing disastrous results.

Any quantities of luminous composition should be stored in lead containers of sufficient thickness to absorb the radiation, and removed far enough from all workers to avoid the dangers from the radiation. Lead containers should be provided with appropriate screening for the soft radiations developed in the lead.

Workbenches should be covered with lead of sufficient thickness if electroscopic tests show penetrative radiations, and could advantageously be covered with paper, changed daily to remove any composition splashed on it.

Composition should be furnished in a moist state to the dial painters, or others who apply it, to avoid possible inhalation of dust, and should be supplied only in small quantities, to reduce the hazards from radiation and emanation.

Application of luminous materials should be performed in separate rooms, or far enough away from other workers to avoid dangers to them. The workrooms should be well ventilated, and should be sufficiently large to insure distance between a worker and the material used by coworkers, a problem which can be solved by electroscopic tests. Finished work should be removed from vicinity of operators as soon as possible.

All contact with material should be avoided, and strict supervision should be applied to see that this rule is enforced. Brushes should not be pointed in the mouth or between the fingers, and other implements should not be wiped between the fingers. Rubber sponges, chamois skins, or cloths should be used for wiping, if necessary. The best arrangement for pointing brushes seemed to be a special spring clip, with insides of the jaws covered with removable chamois. Pen racks should be provided for holding the implements when not in use, to prevent soiling of workbench and possibly the fingers. Should the fingers accidentally become soiled, they should be cleansed at once.

Special holders should be provided for containers or crucibles used by dial painters, to eliminate the necessity of holding them with the

fingers when adding thinner and stirring the mixture, and to avoid contact through splashing. Special long-handled holders for the containers while washing them, and long-handled brushes should be used for the operation, to avoid getting the hands in the water. During the washing rubber gloves should be worn.

Weighing and moistening of composition should be done at a safe distance from the dial painters or other workers. The operations should be performed under a low glass hood, provided with suction to keep any possible dust away from the operator. Lead glass should be used. A lead-lined cabinet with leaded rubber sidepieces, such as used in laboratories, would be preferable. Leaded rubber gloves should be worn during the work.

The arrangement of rotating the weighing and moistening operation among the different dial painters appears a good plan. A monthly change is preferable.

Dusting performed under a hood or in a box with open ends should not be permitted. All dusting should be automatic, eliminating insertion of hands in box.

Considerably more material is handled both by the dusting method and the transfer method than in hand application. Consequently proper precautions should be taken to reduce the hazards from radiation by lead screens between the material and the operator, and from the emanation by an exhaust system, if necessary. The amount of radioactive exposure can be determined by electroscopic tests.

Eating of any kind in workrooms should be prohibited, and washing at lunch time and quitting time should be made compulsory, preferably under supervision to be sure it is observed.

### Laboratory Work

In 1922 the medical director of one of the leading radium-producing companies in this country stated:

> Since the establishment of the laboratories that have produced 85 grams of radium (estimated to be upwards of 60 per cent of all the radium ever refined) there have been no deaths among the laboratory workers * * *. The general health of the laboratory workers is, I believe, above the average.[3]

This condition was, however, changed three years later. Between May 31, 1925, and December 1, 1928, there were five fatalities, diagnosed as caused by exposure to radioactive substances, among the laboratory workers, and two fatalities, undoubtedly due to the same cause though not so diagnosed.

Six of the deceased chemists began to handle radium in the period of 1911 to 1914, when the dangers were not realized and protection not thought necessary. All seven were employed in establishments engaged in extraction of radium and mesothorium from uranium ores and monazite sand. Their fingers showed typical cutaneous lesions, or radium burns, probably all resulting from careless handling during the early years.

An eighth fatality, which occurred a couple of years previously, is strongly suspected of having the same origin.

One technician, employed in work with radioactive substances for more than 14 years, is apparently affected from the exposure.

[3] American Journal of Röntgenology, October, 1922: "The effects of the X rays and radium on the blood and general health of radiologists," by George E. Pfaler, M. D., Philadelphia, Pa.

Another, also engaged in the work for about 14 years, has been found radioactive by electroscopic tests. Four other workers were found, in whom blood changes had occurred. It is possible, however, that these changes were only temporary, and that these workers may have recovered since their transfer to other kinds of work.

A vast difference exists, of course, between the possibilities of exposure in luminous dial painting, where the materials contain only minute fractions of radioactive substances, and in laboratory work, where materials of high radioactivity are handled and the exposure hazards are consequently intensified greatly. There are three sources of hazard for laboratory workers. The principal one is the penetrative or external radiation, which acts directly on the tissues or the blood. There are, however, also dangers from inhalation of dust containing radioactive substances when manipulating the preparations, or from inhalation of emanation during such operations or in breaking of tubes.

### Reduction of Hazards

Suggestive changes in the blood of European radiologists were recognized as early as 1909, but were not considered serious. The known deaths in Europe among these persons before 1916 all resulted from malignant diseases, originating from overexposure to Röntgen rays, except one case of myeloid leukemia in 1911. These deaths resulted in the adoption of some protective measures, principally lead screening, to safeguard the operators of the X-ray machines.

Up to 1916 only about 50 grams of radium had been produced in the world, and the dangers involved in its handling were not understood. As the use of radium increased, and the knowledge of its actions grew, it was observed that the effects of excessive radiations from it on the human system resembled the effects from overexposure to X rays. Serious burns resulted after the tubes containing radium salts had been handled by bare hands, in some cases developing into malignant disease and necessitating amputations. Blood changes finally appeared, and several fatalities, definitely attributed to radium exposure, occurred among radium workers in Europe between 1916 and 1921.

Precautions were adopted at different European institutes, and in 1921 a committee, appointed by radiological and scientific bodies of England, issued a preliminary report recommending efficient protection and suitable working conditions to guard against the known injurious effects. This was followed by a revised report in 1923, and a later one in May, 1927, based on inspections and tests.

Many of the measures had already been adopted in this country, where investigations of the hazards had also been conducted by scientists. The protective measures in use were as follows: Long-handled forceps or tongs for handling the sealed glass or metal tubes containing radium salts; metal screens between the operators and the radium; lead-lined carrier boxes; lead containers for storage; artificial ventilation of workrooms, especially where emanation from unsealed preparations is or might be present; rotation of workers; annual vacations; periodic blood examinations; and complete absence from work whenever indications of injury are recognized.

Recommendations for X-ray and radium protection, based on the English recommendations, were adopted at the International Congress

of Radiology in Stockholm in July, 1928; these were later approved by the Council on Physical Therapy of the American Medical Association, and are:[4]

Use of long-handled wooden forceps for manipulating sealed tubes of radium salts; long-handled carrier boxes, lined with 1 centimeter of lead; lead screen around supply of tubes, 5 centimeters thickness per 100 milligrams of radium; lead screen not less than 1 inch thick between operator and radium during manipulations; and lining of shipping containers for small quantities with at least 3 millimeters of lead. Similar measures are recommended for workers with emanation, and also that thickness of lead surrounding the stock solution of radium for the emanation machine be as follows:

| Quantity of radium element: | Thickness of lead | |
|---|---|---|
| | Centimeters | Inches |
| 0.5 gram | 15 | 6 |
| 1.0 gram | 16.5 | 6.6 |
| 1.5 grams | 17 | 6.8 |
| 2.0 grams | 18 | 7.2 |

The original recommendations by the English committee advocated 8 inches of lead for one gram of contents, 10 inches for 1.5 grams, and 12 inches for 2 grams.

### Remaining Hazards

The hazards for the workers in the industrial and commercial establishments of the industry in this country, grouped here as laboratories, have been greatly reduced through adoption of protective measures. These were adopted voluntarily, as control of the dangers from radioactive substances has not been covered by factory regulations in the different States where establishments exist at the present time. Consequently each firm adopted whatever precautions it thought necessary for its individual requirements.

The total hazards for the industry were still further reduced through the complete suspension of radium extraction in the United States since 1922. The importation of the comparatively cheaply produced radium salts from Belgium forced closing of the mines and, as soon as the radium had been extracted from the supply of ore at hand, also of the refining plants.

Consequently, the only extraction of radioactive substances in this country is of mesothorium, obtained as a by-product in the manufacture of thorium nitrate for incandescent mantles. Some establishments collect the emanation from a supply of radium, technically named radon, and confine it in glass capillary tubes, sealed at both ends, for sale to physicians or hospitals. Radioactive luminous composition is manufactured in one establishment. In others, radium salts or luminous composition are stored for sale and distributed to the various users. One establishment formerly measured all of the radium and mesothorium produced in this country, and certified the contents of the containers. This is still done with the mesothorium, as well as with practically all of the radium imported and sold here for therapeutic or scientific purposes. The work in nearly all of these establishments involves handling material of high radioactive strength.

[4] For complete text, see Journal of the American Medical Association, Apr. 27, 1929, pp. 1428–30.

The preliminary extraction of mesothorium, in the form of a crude concentrate, has been declared free from danger by some scientists. It certainly does not look injurious to the health of the workers, but the absence or presence of excessive penetrating radiation from the monazite sand, or from the different stages of the product in the process of manufacture can not be determined by sight. Since one death occurred in one of the establishments doing such work, and suspicious blood changes developed in other workers, it seems that some danger does exist.

The later steps in refining the crude concentrates by fractional crystallization are done in another establishment under supervision of a scientist, who is thoroughly aware of all the known hazards and declares all precautions are taken. It is, nevertheless, questionable if the assistants actually engaged in the work do not ignore the dangers to a certain extent—the inevitable factor of the human element again. One of the assistants showed blood changes after working about 500 hours in a period of 8 months, but recovered after being transferred to other work. Another assistant, who worked about 800 hours during 15 months, showed a slight radioactivity during the last electroscopic examination, but thought this was from his clothing.

Laboratories for the production of emanation are ordinarily provided with protection for the workers. Modern types of emanation pumps are well screened. As radon is inactive when first pumped into the glass tubes and is not considered dangerous until three to four hours afterwards, while the work with the tubes is finished inside of one-half to two and one-half hours, varying in the different establishments, that part seems safe enough. There is ordinarily considerable storage of radon in the laboratories, which in all cases is separated from the operator by lead screens, although these are not so heavy as those approved by the American Medical Association. It was stated in one establishment that dental film tests in various parts of the pumping room showed it would take 18 years in the most exposed part to produce an erythema dose.

It seems that only scant attention is paid to the condition of the dark rooms, where the finished products are measured for radioactivity. In one instance this was found to be located in the rear of a toilet, and not provided with any ventilation—not a very desirable condition even though it may be used only for short intervals.

Operation of emanation pumps is ordinarily rotated among the workers. In one establishment each operator works the required time each night during one week out of every five weeks; during this time he does no work in the daytime. During the other four weeks he is employed at other laboratory work for seven hours on five days and three hours on one day. In another establishment the employees are not permitted to work more than four hours daily in the laboratories, and the assistants are replaced every two years. In a third establishment operators work only five hours on days of pumping.

Regular vacations are given to break the continuity of exposure. One plant gives a vacation of one week per month, plus one month per year.

The laboratory workers claimed that all known precautions were strictly observed individually. As one pump operator stated, three

specific rules were always followed: "Back of lead!" "Make it snappy!" and "Stay away from it!"

In spite of these precautions one physicist was found whose blood count looked suspicious, but that condition might be the result of previous other work. He had been working with radium for more than 15 years, and has assisted in the extraction of the elemental salts from the ore. His fingers were scarred from burns. Another case was heard of, that of a student who had worked in one of the emanation laboratories for about two years, and some time after leaving found that his blood count indicated affection. This case could not be verified, and is not included among the total cases mentioned.

Considerable hazard may have existed in the laboratories where radioactive luminous material was formerly manufactured, but the one in which it is done at present seemed well provided with safety arrangements for the workers. One condition was seen, however, which was not desirable, though apparently due more to carelessness on the part of the chemist than to disregard for possible danger on the part of the firm. A lead-lined cabinet, with lead glass panels, was used for weighing the finished composition and filling the tubes. The front of the cabinet was covered with a leaded rubber apron, provided with thin rubber gaskets for admission of the gloved hands of the operator. The gaskets were torn so that there was a chance for the fine particles of the composition to escape from the cabinet during the process with the consequent possibility of inhaling the dust.

The larger establishments handling radioactive substances for sale use necessary precautions in storing the supply and in preparing larger amounts for shipment, though it is questionable if the wrapping for the shipments always comes up to the standards approved by the American Medical Association, or if the wrapping tables are provided with sufficient lead screenings to protect the bodies of the packers.

While the large dealers are usually particular about such minor, but still important details, the same can not be said for the small dealers in radioactive materials. In the establishment of a large dealer in chemicals, who also imports and sells small quantities of radium salts and luminous composition, the tubes containing radium salts for therapeutic or scientific use were kept in an open wooden box in an ordinary safe. It was stated that the exposure was not considered a hazard, as the material was of low grade, only 40 per cent element. As the luminous composition, which was kept in a similar manner in another safe, was much lower in radioactivity, no consideration whatever was given to it.

A private dealer, who imports and sells small quantities of radioactive luminous composition, kept part of his supply in a wall cupboard in his residence, from which his business was conducted. No screening of any kind was provided, but there was no one constantly in the vicinity of the cabinet. The remainder of his supply was stored in the vaults of a bank, likewise not protected by screening but also distant from people. Part of this supply was distributed occasionally through a chemical dealer, who had imported radium salts for therapeutic purposes from Europe until the Belgian monopoly through the discovery of the Congo deposits made it unprofitable. Only samples of luminous composition were kept in stock, and only minor quantities were sold.

Another private dealer, reported to be importing and selling luminous composition, affirmed that statement, but refused to give any information. Nothing was seen in his office to indicate any precautions for handling of the material.

### Conclusions and Recommendations

The general conditions described under dial painting apply to laboratory workers as well as to dial painters, but in more intense form. Considerable time had passed in practically all of the fatal cases before the effects of exposure appeared, making it impossible to determine just what conditions might be responsible for the injuries. The following table shows the periods from the beginning of work with radioactive substances to the appearance of illness, from then until the effects became serious, and from time of incapacity to death, in each of the eight known and suspected fatalities.

TABLE 2.—DISTRIBUTION OF TIME FROM BEGINNING OF EXPOSURE TO RADIOACTIVE SUBSTANCES TO DEATH, FOR LABORATORY WORKERS

| Case— | Length of exposure before appearance of illness | Length of illness before incapacitated | Length of time incapacitated before death | Case— | Length of exposure before appearance of illness | Length of illness before incapacitated | Length of time incapacitated before death |
|---|---|---|---|---|---|---|---|
| | *Years* | *Years* | *Months* | | *Years* | *Years* | *Months* |
| No. 1 | 14 | 1 | 1 | No. 5 | 13 | 3 | 2 |
| No. 2 | 9 | 4 | 1 | No. 6 | 15 | 3 | 4 |
| No. 3 | 14 | 0.5 | 5 | No. 7 | 7 | 1.5 | 2 |
| No. 4 | 10 | 3 | 2 | No. 8 | 5 | 1 | 4 |

In 6 of the 8 cases the deceased were subjected to intermittent exposures from materials of high radioactivity during periods ranging from 9 to 15 years before any ill effects appeared. The effects were often inconsequential, and were not always recognized as associated with the disease until some time afterward. It seems possible that these cases were at least partly caused through the incomplete knowledge in the early years of the dangers in handling radioactive materials. The conditions were probably aggravated later by disregard of the power of the lower-grade materials.

Nearly all of this group of workers had assisted in isolating radium from ore, and had handled large quantities at times. Some of them had also worked with mesothorium in a nearly pure state.

The total periods during which exposure hazards existed were much shorter for the other two cases, 5 and 7 years respectively, but the actual exposures were more continuous, as more hours were worked daily. As nearly as can be learned, the exposure for these two was practically all from material of lower radioactivity, but the individual susceptibility may have been greater. One of these workers had been employed in the extraction of mesothorium, and the other had worked in an establishment where radium was extracted.

It seems strange that no suspicious illness was discovered among the employees in one of the thorium nitrate factories where mesothorium is extracted in the form of a crude concentrate, while one death and several blood changes were found among the employees of another factory doing similar work. The extraction has been carried

on in both factories for about 10 years, and it was stated that the personnel of the first factory consisted of old employees, some of them having been employed before extraction was begun. Individual susceptibility may have played a part in the first factory, but no physical examinations have been made of the workers there, and it is consequently not absolutely certain that none of them have been affected. The suspected cases in the other factory were only discovered through blood examinations.

In 1928 the French Commission on Occupational Diseases classified as sources of poisoning all industrial or commercial establishments isolating radioactive elements and manufacturing derivative radioactive substances, manufacturing medical appliances for radium therapy or X-ray therapy, engaged in research or measurement of radioactive substances, manufacturing radioactive chemical or pharmaceutical products and manufacturing radioactive luminous composition or applying such composition, engaged in storage and sale of radium and radioactive substances, and engaged in therapeutic treatments with radioactive substances, such as clinics, sanitariums and centers for treatment of cancer.[5] Protective measures for workers, and reports from such establishments were recommended.

Similar recognition of the hazards of such establishments by the various States might be a wise move in this country.

In establishments where highly radioactive materials are handled, rules on the order of those adopted by the American Medical Association are ordinarily observed. Somewhat similar precautions had been made effective in the United States Bureau of Standards after an investigation in 1922–23 by the United States Public Health Service.[6] The problems of that establishment differ, however, somewhat from the problems of private laboratories, because only sealed packages of preparations are handled there. Consequently no dangers from either dust or emanation are present, unless the tubes are leaky or broken. All known precautions against radiation are employed, and for several years no indications of injury have been found in the blood of the employees, which is examined regularly every two months.

More or less laxity exists in private laboratories, especially in regard to blood examinations, which are not always made regularly, and often because of the disregard by the operators of the nonvisible dangers from small amounts of radioactivity. There are two other problems, principally associated with these establishments, which seem to have been overlooked to a certain extent.

The gamma radiations form or excite secondary beta rays in material through which they pass, so that even though the gamma radiation is practically completely absorbed by lead screening, the secondary soft beta rays formed in the lead by them may prove a danger. The lead enclosure for a stock solution of radium might in that manner become a hazard to the operator of an emanation pump, or a lead safe containing a large amount of radium salts or emanation in tubes might become a danger to any workers in its vicinity.

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[5] Paris Médical (Paris, France), Nov. 17, 1928, pp. 422–424: "Les accidents causes par les diverses radiations," par le Dr. F. Dervieux.

[6] United States. Treasury Department. Public Health Service. Public health reports, Dec. 21, 1923: "Preliminary note on observations made on physical condition of persons engaged in measuring radium preparations."

The other problem is the possibility of the hard gamma radiations from large amounts affecting occupants of adjoining rooms through the walls, ceilings, or floors, even though the workers in the room itself might be protected sufficiently through screening. In the last report by the English X-ray and radium protection committee it was recommended that protection for that purpose should be equivalent to not less than 2 millimeters of lead. Equivalents are given of 5 or 6 inches of solid concrete or 10 to 16 inches of solid brickwork. The size of the room is not stated, but in the final recommendations adopted by the International Congress of Radiology, and approved by the American Medical Association, the minimum floor areas are specified as 250 square feet for X-ray rooms and 100 square feet for darkrooms, with ceilings not less than 11 feet high. These figures would seem appropriate for radium laboratories as well, on account of the similarity of the penetrating gamma rays from radium and the high voltage X rays.

Such protection would, of course, not be necessary where the supplies are completely surrounded by sufficient screenage, such as in one establishment, where a new storage safe had just been installed. This safe contained a lead block, 15 inches each way. In the center of the block were six drawers, occupying a space 5 inches in width and height, and 15 inches in depth. Each drawer was divided into 3 sections, each 5 inches square. The center section was used for storage of the radium tubes, while the other two sections were filled with lead, making a complete 5-inch wall of lead around the supply. The necessity for protection can easily be determined by electroscopic tests, a method which should be followed in all problems to ascertain if exposure exists.

Thoria factories have not been considered dangerous, and consequently precautions have not been observed in these in the same manner as in laboratories, but it is believed that similar protective measures should be applied in them also, according to the amount of exposure as determined by electroscopic tests. The same thing holds good with establishments where radioactive salts or other preparations are handled.

All of the protective measures adopted by the International Congress of Radiology, and approved by the American Medical Association, should be applied to all commercial and industrial establishments where radioactive materials are manufactured, handled or used, even though such materials have low radioactive power.

It is also recommended that thorough physical examinations be made of all prospective workers before employment, including examination of the blood, and that similar examination be made at least every two months during employment, accompanied by electroscopic tests for radioactivity.

It is believed that the best way to bring about the desired results would be through strict State supervision of all such establishments, exercised by proper State officials, and that no establishments of this character should be allowed to operate otherwise.

It is further recommended that it be made compulsory to inform all prospective employees of the possible hazards and methods of protection, so they can cooperate in protecting themselves.

## Appearance of the Occupational Disease

THE NEED OF luminous dials for military and naval purposes during the World War was an important factor in the development of luminous dial painting in the United States. The industry was, however, very limited, and even at the peak there were probably not more than 350 dial painters at any one time. Nearly all of the dial painters were females.

After the war period the application of luminous material was mainly on dials and hands for watches and clocks, in the beginning principally the cheaper varieties, but later also the higher grades. It was also used for luminating the dials and pointers of technical and scientific instruments, especially for aeroplanes, for electrical accessories, such as switches, push buttons and pull chain pendants, for house numbers, theater numbers, Pullman berth numbers, locks, safe combinations, telephone mouthpieces, fire extinguishers, or other objects which it was desirable to have visible in the dark.

The majority of the work was executed in three large commercial studios, in which the operators were paid at piecework rates varying according to the sizes of the dials painted. One of these had been located in the State of New Jersey since 1913, though moved twice before settled in its final location in 1917. Another had been established in Pennsylvania in 1917, but was moved a year later, part of it to New York and part to Illinois. The New York establishment remained in the same location for about 10 years, but the Illinois plant was moved to a different town in about 3 years, and to still another town a year and a half later. A few of the clock and watch manufacturers established dial-painting divisions but employed comparatively few dial painters until recent years. There were a number of minor establishments, where such work was performed by a few, or even by one person on part time. It was estimated in 1925 by a manufacturer of luminous material that about 110 different concerns, large and small, were then engaged in luminous dial painting.

Dial painting as an occupation seemed desirable. The work was not arduous, requiring quickness and some artistic ability rather than strength or endurance. The operation consisted in covering figures on watch or clock dials with a thin layer of luminous material, previously mixed with adhesive. The mixture was ordinarily applied with a camel's hair brush. Two kinds of adhesives were used. A solution of gum arabic in water was used for paper dials, and water was employed for thinning the mixture. An oil-varnish adhesive was used for metal dials, with a special thinner, though in some places a mat surface was produced on the metal by spraying it with lacquer, permitting the use of the gum arabic and water adhesive on metal dials also.

As the earnings of the operator depended on the number of dials painted, and faster as well as better work could be done with a fine point on the brush, the habit had been formed of pointing the brush in the mouth before reloading them with paint. This was especially practiced where water adhesive was used, as water has a tendency to separate the hairs in a brush. The varnish adhesive kept the point in better shape and less tipping was necessary. The hands of the watches were covered by similar methods.

Compared with other occupations for females, the earnings of the skilled workers were good, ranging ordinarily from $17 to $35 per week in one studio and said to have reached as high as $42. So, while there was a good deal of turnover in the employment, the three large studios had little trouble before the end of 1923 in securing and keeping a sufficient number of workers.

### New Jersey Cases

*Case No. 1.*—On December 26, 1922, a supposed case of phosphorus necrosis was reported by a physician in New Jersey to the local board of health, and reported by it to the State Department of Labor. Investigation disclosed that I. R., a 20-year-old girl, had been employed for at least 2½ years, up to the middle of April, 1921, as dial painter in the New Jersey studio. A year later a tooth was extracted by a local dentist. The area refused to heal. As her condition became worse, she was sent to a firm of exodontists in July, where X rays were taken. The front lower teeth and part of the bone were removed. More bone was removed later, but the necrosis was not checked. She was referred to a surgeon, who had her admitted to a hospital on December 15, 1922. According to hospital records, X rays showed osteomyelitis of the entire horizontal ramus of the jaw. Pus was exuding about roots of both posterior molars on both sides, and all other teeth on lower jaw were absent. Her blood count showed hemoglobin, 45 per cent; erythrocytes 2,448,000; leukocytes 6,200, with polymorphonuclears 85 per cent. An abscess at right angle of jaw was incised and drained. On December 28 her general physical condition was improved. Her blood count showed hemoglobin 55 per cent; erythrocytes 3,192,000; leukocytes 5,880, with polymorphonuclears 79 per cent. She was discharged from the hospital on December 31, 1922.

The investigator visited the studio where the patient had been employed, and which was located in an establishment where radium was extracted from ore and luminous material was manufactured. No violations of State laws were observed, and the firm declared that no phosphorus was used in the material. Consultations with medical experts and examinations of the records of the American Medical Association failed to throw any light on the matter, so the circumstances were referred to the consulting chemist for the New Jersey Department of Labor, a copy of whose report follows:

Report: M. Szamatolski, Ph. D., January 30, 1923.
Case: Miss I. R.

As far as I know, luminous compounds do not contain any phosphorus, but are usually composed of zinc, sodium, magnesia, cadmium, manganese, and similar compounds to which has been added a percentage, usually about 1/100 of a per cent radium and mesothorium compound. As you know, radium has a very violent action on the skin and it is my belief that the serious condition of the jaw has been caused by the influence of the radium.

I would suggest that every operator be warned through a printed leaflet of the dangers of getting this material on the skin or into the system, especially into the mouth, and that they be forced to use the utmost cleanliness. The leaflet should be handed in duplicate to every operator when being employed and one copy be signed by him or her and retained by the employer as proof that the employee has been duly instructed as to the dangers of the occupation.

If you will let me have a sample of the luminous compound I will be glad to analyze it fully so as to be sure that there is no phosphorus in the compound.

(Signed.) M. Szamatolski.

Samples of luminous materials were sent, as requested, resulting in another report, a copy of which follows:

Report by M. Szamatolski, Ph. D., April 6, 1923.
In the case of Miss I. R.

We do not find any phosphorous in the compound submitted and I feel quite sure that the opinion expressed in my letter under date of January 30, 1923, is correct, and that such trouble as may have been caused is due to the radium contained therein.

(Signed.) MARTIN SZAMATOLSKI.

This is believed to be the earliest recognition of radioactive materials as the source of the occupational disease among the dial painters of this country, which was brought so forcibly to the attention of the public a few years later through the newspapers. It was, however, not recognized at the time as an occupational disease, and the extent of its ravages were not imagined.

The patient had been returned to the hospital on January 17, 1923, for further incision and drainage of the abscess. A projecting piece of bone was removed. She was discharged three days later, but was returned again on January 25 for similar treatments. Her strength was being sapped by the anemic condition. The blood examination showed hemoglobin 35 per cent and erythrocytes 2,672,000, so a blood transfusion was given on February 8. She was discharged from the hospital on February 28, 1923, in practically the same condition as when she entered.

Subsequent records were not available, except that a lung condition developed, which was thought suspicious, as both parents had died from tuberculosis. A Röntgen report showed increased density in the upper lobe of the right lung. It was stated that the etiology was not certain, but suggested aspiration pneumonia. The death certificate shows the cause as "Phosphorus poisoning-necrosis of jaw (complete)," and the contributory cause as "Lung abscess, about 2 months; determined by X-ray test, not decisive; contracted at place of business." In this case the illness appeared about 3½ years after beginning work with radioactive materials and one year after leaving employment. The death occurred about 15 months later.

Investigations were continued by the New Jersey Department of Labor. Several inspections were made of the dial-painting studio and the rest of the establishment by officials of the department and by experts. No violations of State laws were observed. Inquiries among medical experts on the possible damage from the radioactivity in the paint were answered in the negative.

*Case No. 2.*—In February, 1924, a health officer in the vicinity of the same establishment reported two other deaths of similar character among former employees, but the death certificates did not indicate the occupational origin. One case was A. M., a young woman 25 years old, who had been employed as a dial painter abount 5 years, and who died September 12, 1922. The primary cause of death had been diagnosed as ulcerative stomatitis, and the contributory cause as syphilis. A statement was, however, made later by the physician to the health officer that death was probably caused by the same poison that was responsible for the death of I. R.

The progress of the disease had been practically similar. A tooth had been extracted, and the socket failed to heal. Necrosis devel-

oped. Though extreme methods of treatment were resorted to, the dental surgeon in charge of the case could not arrest the progress of disintegration. Constant severe pain was experienced. After about seven months the chin bone had decayed so that it was removed by simply lifting it out with the fingers. A week later the entire lower jawbone was removed in a similar manner. The illness appeared about four years after beginning work and while still employed, but did not become severe until about three months later. Death occurred about nine months afterwards.

*Case No. 3.*—The other case, H. Q., was a 22-year-old girl, who had been employed as a dial painter for about 20 months, and died on June 3, 1923. About a year and a half after stopping work, she was affected with sore throat and swelling of the face. She died about 20 months later, according to the death certificate, from "Anemia, with contributory: Vincent's angina, and secondary: Pneumonia; determined by chemical and laboratory tests."

The physician who attended her could not at the time determine the underlying cause, but her symptoms and history corresponded to those of the other dial painters. She also had dental trouble, ulcer of the gum, and discharge of pus.

*Case No. 4.*—A suspicious case, later diagnosed as radium poisoning, was discovered in G. F., a young woman 25 years of age, who had been employed as a dial painter for nearly four years. About two years after leaving the studio, rheumatic-like pains developed in one foot, later extending to the back. Her condition became progressively worse. Her teeth became affected. Several were extracted, and necrosis developed. She was hospitalized, and the jaw was operated on. According to the hospital records, the X-ray diagnosis was "Chronic osteomyelitis of the jaw, possibly due to phosphorus poisoning."

This patient is still alive. A number of operations were subsequently performed on the jaw every few months, about 20 in all, some slight and some painful. X rays show a practically complete collapse of the spine (necessitating a brace on her body) and decided necrosis of the left foot, likewise requiring a brace. Arms, wrists, and hands are also affected.

*Case No. 5.*—Another case had appeared meanwhile, H. V. K., a 24-year-old woman, who had worked as a dial painter about three years, until some time in 1920. The work was discontinued on account of ill health, and she was incapacitated for about two years. Trouble then developed with her teeth, which was treated first as pyorrhea but which developed so that extraction became necessary in September, 1923. Necrosis followed, accompanied by anemia. In January, 1924, the case was referred to a New York surgeon, who hospitalized her three times and performed several operations on her jaw. His records stated: "Saw first January 25, 1924—last, at office, August 11, 1924. Diagnosis: Radium jaw (osteomyelitis of the jaws, plus poisoning by a radioactive substance)." The term "Radium jaw" and the diagnosis of the origin were also mentioned later in a public address by him.[7]

[7] Blum, Theodore, M. D., New York: Osteomyelitis of the mandible and maxillæ. An address delivered before the American Dental Association in September, 1924.

The patient was again hospitalized, but was discharged November 27, and returned home, where she died on December 9, 1924. The official death certificate gives the cause as "Occupational poisoning, necrosis of jaw and maxillæ. Deceased was employed painting dials on radium-faced watches, using a fine brush, at times moistening edge with mouth. Contributory: Profound anemia."

*Examinations of dial painters.*—Reports of this case prompted the firm early in 1924 to offer the dial painters in its studio free physical examinations by a New York institution specializing in examinations. Only six of them were examined, among them M. S., who succumbed to the disease a year later. The report of the institution stated that the examinations showed no evidence of occupational poisoning.

Arrangements were made by the firm with the school of Public Health of Harvard University to investigate the working conditions and the physical conditions of the employees in the establishment. The plant was visited on April 16, 1924, and a detailed inspection lasting for three days was made later. A report sent to the firm on June 3, 1924, and published about a year later,[8] was accompanied by a letter, stating "We believe that the trouble which has occurred is due to radium."

The investigators were advised that the afflicted persons had left the employ of the firm long before being taken ill, and were asked why no such trouble had occurred elsewhere, as, for instance in another dial-painting studio visited by them shortly before. The reply to this question was as follows:

> In case of a substance such as radium, which is deposited in bone, there is no reason why—given sufficient time for exposure and time for deposition, that bone disease may not develop many years after exposure, provided bacterial infection is permitted.
>
> Conditions in [the other studio] differed. Only three operators at work, and never sufficient volume of dial work to keep the same girls employed over long periods.

*Effect of developments.*—The authorities of various States, where dial-painting studios were located, were requested by the New Jersey Department of Labor to investigate conditions among the dial painters there. No sign of occupational disease could be found, and the peculiar condition appeared to be confined to the single large New Jersey studio.

Dental troubles began to appear among other workers there. Practically all of the dentists in the surrounding territory refused to do any extractions for girls who had been employed as dial painters, as it seemed that whenever a portion of the bone was removed the destructive process was stimulated. The dial painters in that studio became panic stricken and left their jobs, so that by December, 1924, only eight were working there, two of them new employees. Newspaper publicity regarding the New Jersey situation spread the alarm to other localities, but other dial-painting studios were but slightly affected, as no local cases were discovered. The reduction in force curtailed the production in the New Jersey studio, and practically forced its customers to start individual dial-painting studios. There

[8] Journal of Industrial Hygiene, Baltimore, August, 1925: "Necrosis of the jaw in workers employed in applying a luminous paint containing radium," by William B. Castle, M. D., Katherine R. Drinker, M. D., and Cecil K. Drinker, M. D.

was, however, a decided slump in the demand for a time, probably also a result of the publicity.

*State regulation of working conditions.*—In June, 1925, the New Jersey Department of Labor received a complete copy of the report of the 1924 investigation of the studio and requested the firm to carry out the recommendations embodied in the report. The latter agreed to moisten the luminous material before distributing it to the operators, to do this under a hood provided with an exhaust, to provide the operators with working gowns, and to provide rubber gloves for the left hands of operators.

*Case No. 6.*—S. M., one of the dial painters examined by the medical institute in 1924, had suffered neuralgia-like pains in one leg during the previous year. She was mentioned in the report on examination of the establishment as having slight pyorrhea and moderate changes in the blood, but no treatment was advised. She was then 33 years of age and had been painting dials for about 5½ years. She continued to work until March, 1925, when a bad necrotic and anemic condition compelled her to stop. Growing worse, she was admitted on June 12, 1925, to a hospital, where she died six days later. Her case, including necropsy and electroscopic tests, is fully described by Dr. H. S. Martland, examining physician of Essex County, N. J., and his associates, who had become interested in the case.[9]

The death certificate gives the cause of death as "Acute anemia of the pernicious type, probably secondary to exposure to radioactive substances," and the contributory cause as "Necrosis of the jaw, sepsis; contracted at place of work; determined by autopsy."

*Case No. 7.*—On June 7, 1925, the newspapers of the country carried a notice of the death of E. D. L., chemist in the same establishment, as a victim to the action of radium. His case differed essentially from those of the dial painters, as he had handled large quantities of almost pure radium and mesothorium. The prominent necrotic features were absent, but a resemblance existed in the presence of anemia, though of a different type. He was 36 years of age, and had worked with radioactive substances for about 14 years, mainly in extraction of the elemental salts. His health had apparently been excellent, except for a tired feeling during the last year. He collapsed suddenly, blood transfusions had no effect, and he died 25 days later. The death certificate gives cause as "Aplastic anemia of pernicious type." This case was described in full by Reitter and Martland.[10] Autopsy and electroscopic findings were included. These showed that, although the radioactive substances had not been deposited in the system through the mouth in the manner of the dial painters, there was an active deposit of 14 micrograms of radiocative substances in the skeleton.

*Case No. 8.*—The death of another worker with radioactive substances occurred in New Jersey on June 6, 1925, the day before the preceding fatality, but in a different establishment, a thoria factory. J. G. B., a chemist, had been employed in the factory for 8 years, in special operations for a couple of years, and from then on in the

[9] Journal of the American Medical Association, Dec. 5, 1925, pp. 1769–1776: "Some unrecognized dangers in the use and handling of radioactive substances," by Harrison S. Martland, M. D., Philip Conlon, M. D., and Joseph P. Knef, D. D. S., Newark, N. J.

[10] American Journal of Röntgenology and Radium Therapy, August, 1926, pp. 161–167: "Leucopenic anemia of the regenerative type, due to exposure to radium and mesothorium," by George S. Reitter, M. D., and Harrison S. Martland, M. D.

extraction of mesothorium. He worked intermittently on high concentration, and was burned on the fingers two or three times before he became acquainted with the dangers. His health was good up to October, 1923, when he suffered from chills and fever through no apparent cause, and also a cough. Attacks continued at intervals of about two weeks until December, 1924, when the trouble stopped suddenly, also without known cause. Investigation shows that he changed from high concentrates to other work, which probably accounts for it. He did not work with radioactive materials for six to eight months, but began again on February 27, 1925. About 1½ months later he commenced to feel bad, and developed cough, weakness, lassitude, palpitation on exertion, throbbing in the ears, dyspnea, and petechia purpura on different parts of body. He was admitted to a hospital on May 26, 1925.

The hospital records show that when examined on May 18 his blood count was: Hemoglobin 40 per cent; erythrocytes 1,720,000; leukocytes 4,000, with polymorphonuclears 46 per cent and lymphocytes 48 per cent. Blood transfusion was given, but on June 3 the blood count was: Erythrocytes 1,080,000 and leukocytes 2,100. A slight improvement was shown on June 5, when the blood test gave: Hemoglobin 29 per cent; erythrocytes 1,350,000; leukocytes 3,000, with polymorphonuclears 32 per cent and lymphocytes 64 per cent. However, death occurred on the following day. The cause of death is given as pernicious anemia.

Autopsy records show marked congestion of lungs, a yellowish-white liver, and a yellowish-red bone marrow in the ribs. The anatomical diagnosis is given as: "1. Acute broncho-pneumonia. 2. Aplastic anemia. 3. Fatty degeneration of liver. 4. Parenchymatous degeneration of kidney and liver."

The physician who had attended the deceased stated that he had been doubtful about the origin of disease, but on comparing it with other cases due to radioactive substances, decided this was the cause.

*Case No. 9.*—At the time of the death of the two chemists another serious case had developed among the dial painters from the studio. M. C., 24 years old, had been employed there about four years when her health began to fail, in 1921. She suffered from extreme fatigue, weakness, and pallor, but she continued at work. Toothache and swelling of the face appeared in October, 1923, necessitating the extraction of two molars on December 24. A piece of decayed bone came out with one of the teeth, showing necrosis, so she did not return to the studio.

The progress of her case while she was still alive was fully described by Martland and associates in their 1925 report.[9] A summary of the case with the results of the autopsy and electroscopic tests was presented in 1926 by Martland.[11]

Death resulted December 26, 1925, over eight years after beginning work, or about four years after the disease first appeared. The death certificate attributes the death to "Chronic anemia of pernicious or regenerative type, due to radioactive substances; occupational"; and the contributory cause to "Terminal pneumonia." The electro-

[9] Journal of the American Medical Association, Dec. 5, 1925, pp. 1769–1776.
[11] Archives of Pathology and Laboratory Medicine, October, 1926: "Microscopic changes of certain anemias due to radioactivity," by Harrison S. Martland, M. D., Newark, N. J.

scopic tests revealed a total of 150 micrograms of radioactive substances in the skeleton.

*Other investigations.*—In April, 1925, a survey of conditions was made by the Bureau of Labor Statistics. No indications of similar conditions were found elsewhere than among the employees from the one studio, where the work had practically stopped. It was, however, observed that in spite of the publicity in the newspapers, the method of tipping the brush in the mouth was still practiced in other establishments. Publicity of findings was withheld at the time, on account of litigation over the responsibility for the deaths.

A statistical survey of the illnesses in the New Jersey studio was made about the same time by F. L. Hoffman, whose report on conditions was the first published account of the situation.[12] He discovered five fatalities and eight other cases affected but still alive. He suggested the possibility of mesothorium being responsible for the disease, as the establishment where the studio was located used mesothorium instead of radium in the luminous compound manufactured by it. The idea seemed feasible at the time, as all of the cases had occurred among employees of this studio alone, and it was not known then that some of the afflicted workers had stopped dial painting before mesothorium was first used.

A private investigation was started in 1925 by the employers, who enlisted the services of Frederick B. Flinn, of the College of Physicians and Surgeons, Columbia University, New York. Dial painters of several studios were examined, including careful inspections of the oral cavity, X rays of the jaws, blood counts, and also electroscopic tests for radioactivity where possible. As a result of that investigation an article was later published by him, denying the industrial hazard.[13]

Dial painters in other studios in different States became frightened through the publicity of the New Jersey cases. It was difficult at times to secure sufficient workers for the larger studios. One of these was compelled to start an auxiliary studio in another town, where less was known about it. In February, 1926, a chain of Sunday newspapers carried a feature story on the New Jersey situation, which created further panic among the workers. This was especially the case in the places where the employers had managed to minimize the published accounts. In one establishment employing over 20 dial painters, all of these employees stopped work. The firm offered to have conditions and workers examined by experts and succeeded several days later in getting three-fourths of them back to work.

Suits had been brought against the firm operating the New Jersey dial-painting studio by relatives of some of the deceased dial painters. These suits were settled out of court, with the understanding that the firm did not assume responsibility for the cause of the deaths.

The New Jersey Department of Labor had continued its inquiries for information on similar occurrences in other places here, in Germany, Switzerland, and in England, but the search proved futile. Dial painting, however, soon became only an unpleasant memory in

[12] Journal of the American Medical Association, Sept. 26, 1926: "Radium (mesothorium) necrosis," by Frederick L. Hoffman, Newark, N. J.

[13] Journal of the American Medical Association, Dec. 18, 1926: "Radioactive material an industrial hazard," by Frederick B. Flinn, New York, N. Y.

New Jersey. The personnel of the large studio there had been reduced to one employee by April 3, 1926, and the studio was closed on November 1, 1926. Extraction of radium and mesothorium had been discontinued six months before. Manufacture of luminous material was continued in another laboratory, located in New York, where dial painting on a small scale was also carried on.

New cases of poisoning continued to appear, though no more fatalities were announced. Five of these cases have become well known all over the country through the newspaper and magazine articles about them. They are apparently affected more by crippling bone lesions than by necrosis of the jaws, though trouble with the teeth was claimed by all. One of these cases was described as Case No. 4, and together with the other four are discussed in Martland's recent article.[2]

*Case No. 10.*—The second, K. S., was reported by Martland and associates in 1925[9] as being radioactive but otherwise apparently healthy. She was then 26 years of age. She had been employed as dial painter and instructress in the studio for about four and one-half years in a total period of five and one-quarter years. While she had been ill two years after starting work there and once or twice later, serious difficulty did not appear until November, 1926, or more than nine years after she began to work with radioactive materials.

*Case No. 11.*—The third, Q. M., started as dial painter in 1917, when 17 years of age, and worked about 15 months, then married and quit work. After the birth of a child in August, 1923, pains developed in hip and limbs. X rays of hips in 1924 looked normal, but others a year later showed necrosis.

*Case No. 12.*—The fourth, E. H., started as a dial painter in 1917 when 16 years of age. She worked for about four and one-half years, then intermittently for about one year during a period of three years. In 1925, eight years after starting to work, pains developed in one knee, spreading to the hip, and later also to the other leg and to the arms. X rays show necrosis.

*Case No. 13.*—The fifth, A. L., likewise started to work in 1917. She was then 23 years of age. She was employed as a dial painter for about four and one-half years. Pains appeared in legs in 1925, shortly after the birth of a dead child. X rays show necrosis of hips.

*Examination of remains.*—In October, 1927, the remains of one of the former dial painters, described as Case No. 2, whose death had been attributed to syphilis, was exhumed for examination to determine the actual cause of death. Electroscopic tests were made by Dr. Alexander O. Gettler, toxicologist and chief chemist, office of the medical examiner of the city of New York. His report stated that 11.36 micrograms of radioactive substances were found in the parts examined, 22 per cent of the entire body weight, which would equal 48.282 micrograms for the entire body. He also stated that some of the tissues were analyzed for poisons in general, but that none were found present other than radium.

This seems to prove without question that the death was caused not by syphilis but by radioactive substances. It is not possible to determine in how many cases a wrong diagnosis has been made as a

[2] See footnote 2 on p. 24.
[9] Journal of the American Medical Association, Dec. 5, 1925, pp. 1769–1776.

result of the cause of the disease not being understood nor how many there are who are still alive but who have suffered serious impairment of health. Several other cases, both fatal and nonfatal, were discovered during the present investigation. Some of these had been mentioned in the report of Hoffman.[12] The possibility of future litigation prevents publication of more than brief summaries.

*Case No. 14.*—E. E., a 33-year-old woman, had been employed as a dial painter in the studio for about two years, and afterwards as a clerk in a department store. About seven years after leaving the studio she fell down stairs and injured her shoulder and left foot. She continued working for about eight months, when the pain from the injury forced her to discontinue. She consulted a surgeon, who treated her for awhile at home. As the pain became more severe, she was admitted to a hospital on October 24, 1927, 13½ months after the accident. According to the hospital records she died there on December 13, 1927, following an operation for removal of an osteogenic sarcoma of the scapula. The death certificate gives this as cause, but the hospital records state also: "Contributory, radium poisoning." This case is described further in Martland's recent article [2] under bone sarcoma, with an estimate that the skeleton contained about 50 micrograms of radioactive substances.

*Case No. 15.*—This case is briefly referred to by Martland in the same article.[2] J. S., a 20-year-old girl, had been employed as a dial painter in the studio for about four years. A severe swelling of the knee necessitated stopping work in 1922. The swelling increased and the knee pained greatly at night. Hospital records show that a surgeon was consulted in July, 1923. He found considerable fluid in the joint, with sharp pain on motion, especially on flexion. Some of her teeth were very bad, and dental care was advised. The Wasserman test was negative. Tuberculosis was suspected, but a specimen from her knee showed no tubercular bacilli nor organisms of any kind. The blood count was nearly normal. Progressive X rays showed marked changes in the soft tissues, but no evidence of bone disease.

Her dentist sent her to a firm of exodontists, who told her that there was pus on all her teeth, and extracted seven at one time. She was admitted to the hospital, December 3, 1923. Later X rays indicated sarcoma, and she was discharged after two weeks to a Röntgen institution for X-ray treatments. Several were given between December 23, 1923, and March 4, 1924. She suffered severe pain, and finally died on April 15, 1924. The death certificate gives the cause as sarcoma of the right knee.

*Case No. 16.*—M. H., 36 years of age, was employed as a dial painter at the studio for about four years. She left to be married, but returned two years later and worked over three and one-half years more. Her health began to decline during the first employment period. She suffered from rheumatic pains in the joints and from swelling of the body, and kept losing weight without apparent cause. Her physician admitted being puzzled by her illness and asked her if there was any poison kept around the house. She improved a little from time to time but grew weaker. In February, 1924, she became frightened by the other cases of radium poisoning and left the plant. A year later she suffered an attack of influenza.

[2] See footnote 2 on p. 24.
[12] Journal of the American Medical Association, Sept. 26, 1926.

Growing worse, she was admitted to a hospital on February 23, but pneumonia developed, and death resulted on March 3, apparently from that cause and poor resistance. The death certificate gives the primary cause as lobar pneumonia, with acute myocarditis as contributory.

The physician who attended this case stated that when he first saw the patient she was in an extremely run-down condition, seemingly from the influenza. He gave the cause of death as it appeared, without thorough examination, because he had no idea of other complications. He did not know her history, so did not connect it with radium poisoning, but during the first few days she did not appear to have an ordinary case of pneumonia.

*Case No. 17.*—L. K. D., a 24-year-old female, had been employed as a dial painter in the studio for about three years during the war. In the latter part of February, 1926, she noticed a marked swelling of her face, which was worse in the early morning. Her ankles and legs began swelling at a later period. A pain appeared in the right lumbar regions of the back. She was hospitalized on March 27. The hospital records show edema of face, hands, ankles, and legs, and evidence of fluid in the abdomen. Diagnosis was: "Chronic nephritis—nephrosis." A week later the edema of the face had grown worse, but it was reduced in another week. Ten days later she was able to be up, and was discharged as improved on May 3. After being brought home she was alternately better and worse. Convulsions appeared on December 31. A near-by physician was summoned, who attended her until her death on January 8, 1927. The death certificate states the cause to be chronic nephritis and chronic myocarditis, and the contributory to be hypostatic pneumonia.

The physician stated that when he was called in her heart and kidneys appeared badly affected. He treated her for the apparent conditions, as he knew nothing of her past history or employment in the studio. When he learned that, three months later, he revised his diagnosis, especially as she had suffered from progressive anemia as well as from the acute conditions described, but no change was made in the official records.

The next four cases are among those mentioned by Hoffman.[12] He also mentions another case which he had not seen, but whose dental record shows necrosis. The patient, V. E., had left the locality, and could not be traced. It was, however, rumored that she had died since leaving there.

*Case No. 18.*—J. F. (J. S.), a 29-year-old woman, was employed in the studio for about eight and one-half years. She had been mentioned in the report of the examination of the establishment in 1924. Her blood condition was not up to standard. One tooth was found to be abscessed, and it was claimed that she was subjected to an undue amount of exposure. One dental firm refused to pull the tooth, as X rays showed indications of necrosis. It was extracted later by another dentist, and it is claimed that no trouble resulted. The former findings indicate a possibility of affection, so the case remains among those regarded as suspicious.

*Case No. 19.*—G. M. S., 23 years old, was employed as a dial painter in the studio for six and one-half years, but left in September,

[12] Journal of the American Medical Association, Sept. 26 1926.

1923, on account of the cases which had developed there. X rays of her teeth before 1925 indicated necrosis, though she claims she had no dental trouble until 1927, when seven teeth were extracted. Although the dentist who performed the work stated there was no necrosis present, the case is still open to suspicion.

*Case No. 20.*—A. B., a 28-year-old female, was employed as a dial painter in the studio for six years, but left there in June, 1922, when trouble with her teeth developed. The first dentist consulted refused to make any extractions, but these were finally made by a firm of exodontists. All her upper teeth were extracted, and 23 in all have been removed. Aside from the pain and loosening of the teeth, she developed a pain in the chest and an intermittent swelling in the left breast, which appeared to be a tumor but which disappeared at times. Although many physicians have been consulted, the origin of the swelling has not been determined. Rheumatic pains appeared later in her body, mainly in the hips. Blood tests showed an anemic condition and X rays indicated a mild necrosis.

*Case No. 21.*—N. M., a woman 29 years of age, was employed as a dial painter in the studio for about six and one-half years, but left because she became afraid of the work. After the extraction of a tooth in January, 1924, the jaw did not heal, and the X ray showed slight necrosis, which the dentist declared was caused by the work. The socket finally healed three years later, but the lower teeth have recently become loose, and her throat feels dry. She has had no medical attention, principally because she has a small growth on the neck, and is very sensitive about it. It is claimed by some to be a benign tumor and by others to be a goitre condition. It has been evident for about six years, but she states there is no pain, and consequently she does not want to bother about it.

*Case No. 22.*—M. K., 38 years old, worked in the studio as a weigher for four and one-half years. In November, 1921, she suffered a bad attack of influenza and was advised by her physician to stop working. Pain developed later in the face, exhaustion, and rapid loss of weight, and finally marked anemia. Two teeth were pulled, showing definite necrosis.

*Case No. 23.*—M. C. C., 38 years of age, worked in the studio as a dial painter and instructress for 15 months. About two years ago, eight years after leaving the employment, her jaw commenced to ache. A year later one tooth in her lower jaw fell out, and others became loose. In February, 1928, severe pain was experienced, and a dentist was consulted. He said the teeth had been neglected, but, learning that she had been a dial painter, he refused to extract any unless X rayed and found free from necrosis. Another dentist did likewise. X rays were taken, showing that part of the jawbone was necrosed. Her teeth are very painful, but she is advised against extractions. Pains have developed in her back and her right side seems paralyzed intermittently.

*Case No. 24.*—H. T., a 30-year-old female, worked in the studio as dial painter for over four years. Trouble with her teeth developed in February, 1928, six and one-half years after leaving the studio. Two teeth were pulled, and necrosis followed. Further information was refused.

*Case No. 25.*—E. M., a woman, age unknown, was employed in the studio as a dial painter for about two and one-half years. It was

stated that her right arm is paralyzed, but further information was refused.

*Case No. 26.*—A. R., 37 years old, worked in the studio for six years, then in another studio for six years, up to May 1, 1928, She began to feel somewhat ill about 1920, but did not associate it with her work with the radioactive materials. It was mainly acidosis, and was thought to be caused through spraying with lacquer, without sufficient ventilation in the room. Her teeth began to get loose about 1917; some were extracted at that time and in 1921, so that only three remained. Two of these fell out recently and the jaw is now very painful. She has lost considerable weight since losing the teeth.

*Case No. 27.*—R. R., a woman 39 years old, worked as inspector in a studio for six years, up to 1922. Her teeth started to become loose in 1918, and 16 loose teeth were extracted. Two teeth were left, to hold the plate, but these have since dropped out. Apparently no other troubles have resulted so far.

Several fatal cases among dial painters were investigated, which had been attributed to the occupation, but it was found that they could not in any manner be connected with it. There must necessarily have been a certain number of deaths among employees in the establishment, which were due to other causes. However, it was found there have been other cases similar to that of the one chemist recorded. The most startling of these, that of Doctor von Sochocky, a former official of the firm, occurred during the investigation.

*Case No. 28.*—The history of the death of Dr. S. A. von Sochocky on November 14, 1928, is well described by Martland in his recent article.[2] It might be added that Doctor von Sochocky was a physician as well as a chemist, and knew he was dealing with dangerous materials, but according to all reports ignored the dangers. He was fascinated by the qualities of radium, and is said to have played with it, taking the tubes of radium salts out of the safe and holding them in his bare hands while watching the scintillations in the dark. He is also said to have immersed his arm up to the elbow in solutions of radium or mesothorium. His death certificate gives the primary cause of death "Aplastic anemia, due to inhalation, ingestion, and penetrative radiation from radioactive substances—occupational," and the contributory cause as "Terminal sepsis, hematuria, and broncho-pneumonia."

*Case No. 29.*—Another death had occurred among the laboratory workers a year earlier. V. H. R., a man 44 years of age, had been employed in the establishment for nearly 13 years. His occupation is stated on the death certificate as clerk, but at least part of his duties consisted in carrying radium salts about the place and wrapping them for delivery. Before his death he told one of the nurses in the hospital that he personally handled all the radium extracted in the establishment. During the early years there was a lack of proper screening and his fingers were badly scarred, according to the report of Doctor Drinker in 1924.[9] The findings of his condition at that time were: "Decayed teeth. Slight pyorrhea. Marked changes in blood. Recommend vacation, protection against gamma radiation, and blood studies." It was stated further: "It is also interesting

[2] See footnote 2 on p. 24.
[9] Journal of the American Medical Association, Dec. 5, 1925, pp. 1769–1776.

that Mr. R's blood shows significant changes—a condition which, if continued, might have disastrous results. The presence of a safe for strong radium in this office is the probable explanation of the exposure. Certainly insufficient protection is clearly indicated." On October 21, 1927, he suffered from a chill. Examination by physician next day showed influenza and acute bronchitis, with secondary anemia.

The records of the hospital to which he was sent give the following results of the blood examination: "Hemoglobin 60 per cent, erythrocytes 2,500,000, and leukocytes 2,500; examination of sputum: Tuberculosis—negative, streptococcus—positive; anemia and leukopenia. Ulcer on finger; violent odor. Upper lips swollen. Eyes sore. No other abnormal signs. Wassermann test, negative." His temperature was normal on entrance, and below normal later. His hemoglobin went up to 70 per cent, but by November 4 had dropped to 35 per cent, with erythrocytes 3,180,000, leukocytes 4,200, polymorphonuclears 52 per cent, and lymphocytes 48 per cent. He improved and was discharged on December 1, but the anemic condition grew worse, so he was readmitted two weeks later, for a blood transfusion. The blood count on admission was: Hemoglobin 28 per cent; erythrocytes 1,900,000, leukocytes 15,000, with polymorphonuclears 40 per cent, large lymphocytes 56 per cent, and small lymphocytes 4 per cent; color index 7. The transfusion gave only temporary relief and he died on December 20, 1927.

The death certificate was signed by a physician who attended him the last three days during the temporary absence of his regular physician. The cause was given as chronic progressive anemia, with a contributory cause of hypostatic pneumonia, as the origin of the disease was not known to the physician. The regular physician admitted freely that the disease was of occupational origin and that the deceased was aware of it.

On the day of death an electroscopic test for gamma radiation was made by physicists from the establishment at which he had been employed. The result is said to have been negative.

*Case No. 30.*—During the investigation it was discovered that the death of another worker six years previously looked very suspicious. M. W., a man 54 years old, had been employed in the extraction division for about five years. According to the firm, his duties were confined to the storeroom for carboys of acids and machinery, but it was admitted that he might occasionally have handled some tailings from the extraction rooms. It was claimed by others that this was part of his regular duties, bringing him into contact with material to which he possibly was peculiarly susceptible. His previous health had been good. He was strong and healthy, but was said to have been a heavy drinker.

In June, 1922, he suffered from sore throat and weakness. His physician thought the trouble was occupational, and advised a vacation. The vacation did not improve his condition, which subsequently was diagnosed as anemia by two other physicians. Injections were administered, but by July 10 he had lost 30 pounds in weight. He was extremely pale and weak, and suffered from shortness of breath and swelling of legs. The condition grew worse and resulted in death on November 18, 1922. The death certificate gives the cause as pernicious anemia.

Connection with exposure to radioactive substances was thought possible by the physician who attended him at death. He said the severe anemia resembled those of the later poisoning cases, and was accompanied by edema. One of the other physicians did not agree with this opinion. He thought that drinking was partly responsible, and he stated that a high blood pressure existed and that chronic nephritis had developed. The relatives of the deceased felt that it was caused through his work, and expressed a willingness to have the body exhumed and tested for radioactivity, but no action had been taken.

### Cases in Other States

While all known cases of poisoning from radioactive substances were for a long time confined to the single New Jersey studio, the first one to start dial painting and probably the largest in the country until the appearance of the disease, similar cases finally came to light in other localities. This showed that the poisoning was not due to some condition peculiar to this one studio, and it also created apprehension among the various firms who were engaged in the work.

Some of these firms had, however, known that outbreaks might be expected at any time, because the investigation conducted by different firms had disclosed radioactivity among the dial painters in some of the studios. The knowledge of these discoveries had, however, been carefully concealed by the firms, who feared disruption of their business if the facts became known. Even the victims had not been informed of their condition, nor the cause, through fear of panic among the workers.

*Case No. 31.*—On October 27, 1926, a paper was read before the laryngology and rhinology section of the New York Academy of Medicine by Frederick B. Flinn. This mentioned that two cases had appeared among the dial painters in a Connecticut studio. One of them, which he stated had been brought to his attention in June previous, was described in detail. Description of subsequent progress of the case and death on January 26, 1927, was added when the paper was published later,[13] giving a fairly complete history of it from the development of the jaw condition.

It is, however, a question whether the poisoning was not indirectly responsible for a previous disability, the fracture of a femur as early as April, 1925, four years after beginning dial painting or one year and nine months after leaving it. A suspicion that the poisoning was the cause, prompted investigation of hospital records for her past history, which is given here to afford a complete picture of this case.

The deceased, E. D., was born November 17, 1902. She had the usual children's diseases. In August, 1918, when nearly 16 years old, she started to work in a watch factory, presumably on clerical work. She suffered an attack of influenza during the first year, and was ill for about one week. In the latter part of February, 1921, she had cerebrospinal meningitis, and was in the hospital for two weeks, receiving intraspinal injections of serum. After discharge from the hospital she remained at home for about two months, then went back to the watch factory, where she was employed in the dial-painting division. The factory discontinued operation seven and one-half months

[13] The Laryngoscope, St. Louis, May, 1927: A Case of Antral Sinusitis Complicated by Radium Poisoning, by Dr. Frederick B. Flinn, New York.

later, and she secured employment as clerk in another establishment. Seven months afterwards she obtained a position as dial painter in another studio, but was transferred at her own request to other work after another seven months. She left the factory six and one-half months later, and continued elsewhere in clerical work until April 28, 1925, when her femur was fractured during dancing.

Her right knee became caught between the knees of another girl, who was swinging her, causing an oblique fracture of the upper third of the femur. She was taken to the hospital, and the leg was placed in a plaster cast. She was discharged 18 days later, with the cast in position. It was afterwards discovered that the fracture had not healed properly, so the bone was refractured and reset. The point here is the comparative ease with which the bone was fractured at first, and also the physical findings in the hospital records: "Thin; good color skin, but white; somewhat anemic." The record of her past history states: "Has lost 30 pounds last year." These findings are suggestive and indicate that the poisoning was active then. Inquiry of the surgeon who performed the operation disclosed that he had remarked when examining the X rays that the bone looked necrotic, but that he had not connected it with any occupational origin. The family history appeared clear and excellent. "Father and mother alive and well; four brothers alive and well; four sisters alive and well." The seemingly pyorrheal condition of the mouth developed about the time of the fracture, but did not become serious until nearly a year later.

The later developments, which are mainly necrosis of the jaws and anemia, were described by Flinn, as previously stated. The death certificate gives the cause as "Chronic poisoning by radioactive paints—duration three one-half years," while the findings of the autopsy were "Gangrenous osteomyelitis of superior maxillæ; ethmoid and sphenoid sinusitis; anemia." It is interesting to note that electroscopic tests at first resulted in an estimate of 100 micrograms of radioactive substances in the body, and that this was, according to Flinn, reduced to 86 micrograms by experimental treatment.

*Case No. 32.*—It was mentioned by Flinn in October, 1926,[13] that another case had appeared in the same studio during the past month, but as a matter of fact it had been regarded as a suspicious case some time before.

The deceased, H. W., was born on July 5, 1904. After working in a button factory, she secured employment in a clock factory in August, 1920. A year and a half later she started in the dial department of the establishment, and continued for over four years, or until June, 1925, when she began to complain of a tired feeling and was transferred by the firm from dial painting to other duties in the factory. She continued to work in the establishment until September 9, 1926, when illness compelled her to stop work.

She had had mumps and chicken pox as a child, but had otherwise been very healthy, except for a swollen knee in 1921, thought to have been rheumatism. She played basket ball a good deal. The hospital records of 1926 show that there was no history of tuberculosis, cancer, or syphilis in the family, and that her father, mother, and one sister were living and well.

[13] The Laryngoscope, May, 1927.

According to information from physicians and from the hospital records, soreness developed in the left arm early in September, then in the left leg, and later in the right leg. The pain was sharp and and lancinating in character. Shortly afterwards pain appeared in the jaw. She visited a dentist several times, complaining of pain in the antrum. Her teeth and gums were examined, and seemed to be in good condition. The gums looked anemic, but nothing was thought of that, as some other members of the family also looked anemic. She was sent to an eye, ear, nose, and throat specialist, who told her that there was no pus present and sent her back to the dentist. The latter found that the teeth were solid, but had a peculiar sound when tapped, and decided on extraction, though X rays did not show anything wrong. On September 9 he extracted a wisdom tooth and two side teeth. Part of the bone came out with the teeth, necessitating curetting.

As the pain continued, he decided that the condition was beyond his powers and sent her to a physician, who had her admitted to a hospital on October 2, diagnosing the case as neuritis and abscessed teeth, caused by radium. She had lost considerable weight and was very pale. The report of the Röntgenologist, however, stated: "Necrosis of jaw. There is a sinusitis of the right antrum. The superior third molars are unerupted. The left lower third molar is impacted and unerupted." Two days later the rest of the lower teeth and two teeth from the upper jaw were extracted. The bicuspids were brittle, and one broke during the extraction. There was marked absorption of bone around the tips of the roots and the alveolar process was very adherent to the teeth. The bone was scraped. The operation gave relief from the pain, but the patient was very weak and her condition resembled pernicious anemia. The condition improved, as seen by the blood count.

TABLE 3.—BLOOD COUNT OF CASE NO. 32, ON SPECIFIED DATES

| Date | Erythrocytes | | Leukocytes | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Differential—Percentage of— | | | | |
| | Total | Hemoglobin | Total | Neutrophiles | Monoblasts | Endoblasts | Lymphocytes | Eosinophiles |
| | | *Per cent* | | | | | | |
| Oct. 5, 1926 | 1,970,000 | 52 | 10,200 | 78 | 1 | 1 | 19 | 1 |
| Oct. 13, 1926 | 2,510,000 | 56 | 4,400 | 68 | ------ | 3 | 29 | ------ |
| Oct. 21, 1926 | 2,510,000 | 56 | 4,400 | 61 | ------ | 1 | 37 | 1 |
| Oct. 27, 1926 | 2,510,000 | 50 | ------ | ------ | ------ | ------ | ------ | ------ |

She was discharged from the hospital, and taken home on October 29, 1926. Pains developed again in the jaws and X rays on December 1 showed necrosed spots in different parts. Five more teeth were extracted on February 6, 1927, being most of the upper teeth. By this time the floor of the antrum was gone, and there were holes on both sides through the jawbone, and considerable sloughing of bone. Before death her jawbone was drawn back and the muscles exposed.

She became gradually worse. Her limbs pained greatly and she had no control over the right leg, which grew shorter and turned in. She died on July 7, 1927. The death certificate attributed the death to radium poisoning, with osteomyelitis of the mandible and maxillæ as a contributory factor. The diagnosis was substantiated by electroscopic tests before her death by Doctor Flinn, who estimated a presence of 100 micrograms of radioactive substances.

*Case No. 33.*—The death of another dial painter in the same studio a couple of years earlier than the two cases mentioned, was attributed by some to the same cause. It was consequently studied during the present investigation. Physicians and dentists were consulted and hospital records secured.

The deceased, F. S., was born on October 3, 1903. She had whooping cough, measles, and mumps when a child, but was in good health up to the time of the appearance of the fatal illness. She was employed as dial painter in the studio on January 16, 1922. Three years later she complained of a sore throat for a few days but did not consider it serious. It grew worse and on January 24, 1925, she was compelled to go to bed. A physician was called, who diagnosed the difficulty as peritonsilar abscess, and incised the abscess. A severe hemorrhage followed next day and was checked with difficulty. In the evening she became very thirsty, and rose and went to the bathroom for a glass of water. Being very weak from loss of blood, she fainted, striking her head severely, and receiving a slight laceration of forehead followed by swelling about both eyes.

About three or four days later a pain developed in the left upper jaw about the second molar tooth. The family dentist, who was called in, said there was nothing wrong with the tooth and refused to pull it. Another dentist was called later who found the tooth quite loose. The roof of the mouth, or hard palate, had a bluish tinge and was spongy. The tooth was extracted, and a small piece of the alveolar process came with it. There was no bleeding. The dentist was recalled 48 hours later, on account of a slight oozing of blood. He found that the bluish area, which had extended from the molar to the medium line of the palate, both anterior and posterior to the molar, had turned almost black, and that the slough of tissues could be removed quite easily with ordinary pliers. It was curetted clean and packed, and the oozing stopped. When first seen, she had a temperature and rapid pulse, which continued in spite of efforts to control them. The temperature fluctuated from 102 to 104, and the pulse from 120 to 130. A physician, who was called in consultation, ordered her removal to a hospital, where she was admitted on February 16.

Her blood count showed marked secondary anemia or leukemia; hemoglobin 40 per cent; erythocytes 768,000; leukocytes 18,000, with polymorphonuclears 40 per cent, large mononuclears 35 per cent, small mononuclears 25 per cent, no eosinophiles or basophiles; morphology poor. The urine was negative to diabetes. A blood transfusion was given from her brother, to which there was a marked reaction—chills and fever, with a temperature of 106.8 for a few hours. No nourishment was retained, and rectal feeding was resorted to. The temperature dropped to 102–104. The pulse was from 130 to 140. Thromboplastine was injected subcutaneously. Digifolin

was injected for the heart. Examination of the culture from the mouth showed mixed staphylococcus and streptococcus, the former predominating.

There was a slight improvement 48 hours after the transfusion. The sloughing was not so marked, but the slight oozing continued. There was a nervous vomiting and difficulty in swallowing, and she grew gradually weaker. Antiseptics had no effect on the mouth lesions. Frequent dressings were applied to prevent the sloughing going through the cheek. She expired on February 21, 1925, nine days after the sloughing first appeared. The symptoms were diagnosed as cancrum oris, or gangrena oris.

The firm which had employed her denied that the illness was caused by radioactive substances, based upon the statement by the physician. The death certificate, a copy of which was obtained from the registrar, gave the cause of death as secondary pneumonia. Comparison with the original certificate showed that there had been an error in recording and the cause should have been given as secondary anemia, with the contributory cause as "Ulcerative stomatitis—osteomyelitis of upper alveolar—peritonsilar abscess." The physician who attended her at death stated that he did not know whether the exposure to radioactive materials had not been a contributory factor, but the death was due to secondary anemia, and positive cultures of Vincent's angina had been obtained from the patient. The physician who had attended her for the abscess stated that he saw her once later (February 3) and found her suffering from chlorosis and anemia. She also had spots on her face, diagnosed by him as noma. There seems to be no question about this being a case of poisoning from radioactive substances, when the symptoms are studied.

*Case No. 34.*—Another undisputed case had appeared among the employees from this studio, though not until two years after leaving employment.

M. D., who had previously been employed in an establishment manufacturing rubber footwear, began work in this establishment in January, 1924, when 16 years old. She started as a dial painter about three months later, and worked in that occupation for 16½ months, when she left to return to her first employment. She had had whooping cough, measles, and mumps when a child, but otherwise her health was good. Her father and mother, four brothers, and one sister were all in good health, and there had been no history of tuberculosis, heart or kidney disease, or venereal disease.

In August, 1927, her face began to pain and swell. A decayed right lower molar was extracted. It broke during extraction, requiring incision of the gum to extract the roots. Following this, both sides of the jaw swelled intermittently, causing severe pain, and the cavity did not heal. She was admitted on March 2, 1928, to a hospital in New York for an operation on the jaw. The hospital records show that she had intermittent swelling and tenderness around the area of the angle of the mandible, on both sides. When the swelling was present she suffered from shooting pains, radiating to the temples and back of the ears, also from considerable pain in eating and tenderness in the cervical glands. The trouble appeared to be located in the bone. There were two discharging sinuses at the angle of the right jaw, with necrotic edges. She looked poorly nourished, and claimed to have

lost several pounds during the last seven months. Her blood count on admission was: Hemoglobin 52 per cent; erythrocytes 3,340,000; leukocytes 6,500, with polymorphonuclears 84 per cent; lymphocytes 15 per cent, and eosinophiles 1 per cent. The impression was: "Bone necrosis of lower jaw, probably from radium. Secondary anemia."

The Röntgen diagnosis on March 5 and 6 stated: "The plates made of the jaws show a marked bone necrosis on both sides, a trifle more marked on the right side than on the left. Plates show a root fragment in the lower left molar area, with some evidence of surrounding infection. Plates made of skull show definite deposits in the occipital region. They have all the characteristics of metastatic carcinoma. Plates of the long bones fail to show any structural changes." Electroscopic examination showed the presence of 40 micrograms of radioactive substances in body. Stools were very active in alpha radiation. On March 12 an abscess on the right jaw was incised externally. Some pus and considerable blood was removed. A small piece, taken for biopsy, showed old fibrous tissue and suspicious looking large cells. The case was diagnosed as radium necrosis of the mandible, with alveolar abscess. Her blood count showed hemoglobin 45 per cent; erythrocytes 2,120,000; leukocytes 4,800, with polymorphonuclears 52 per cent and lymphocytes 38 per cent.

She was discharged on March 14, but returned on May 21, 1928, for another X-ray examination. According to the Röntgen report, "Plates were made covering both jaws and the skull, in two directions, and the plates appear to show a definite progression of the destructive process in the right mandible, with distinct areas of softening, and possible infection around the apices of the canine and bicuspid teeth. The films also appear to show a slight progression of the destructive process in the left mandible, not so marked, however, as in the right. The plates of the skull show a definite increase in the number of metastatic patches, there being a perceptible number of new areas of involvement in the frontal area." She returned home, where she has since been under the care of physicians.

*Case No. 35.*—After the field work of the investigation had been finished, information was received of still another death of a former employee in the same studio, M. W. C., a 21-year-old girl, who had been employed as dial painter there for about 14 months during 1923 and 1924. About the latter part of February, 1929, she suffered from pain in the head, and consulted a physician, who first diagnosed it as a sinus affection. On learning her occupational history, he took the matter up with the members of the firm, who had her examined by an expert. It was pronounced radium poisoning. She died on March 19, 1924, about four weeks after the appearance of the disease. The death certificate gives cause as "Uremia—two days," and the contributory cause as "Septicemia (radium poisoning)—four weeks."

*Possible cases.*—It was learned during the survey that three other former dial painters in this Connecticut studio have been found radioactive by electroscopic tests. One of them, L. D. S., was reported by the expert making the tests in October, 1928, as still radioactive, with an estimated content of 25 micrograms. Another,

C. A. M., who had been employed there for about five years, up to three years before the examination, was reported to contain 2.5 micrograms. The third one, B. G., who had been employed there in 1923 to 1925, was estimated to have in her body about 7 micrograms. The blood counts of all three are apparently normal. One of them, at least, has had abscessed teeth, which were extracted, and did not cause any subsequent trouble, as the sockets healed perfectly.

*Case No. 36.*—In another dial-painting studio, also located in Connecticut, a 25-year-old female, H. M., had been discovered to be radioactive in June, 1928, the body content being estimated at 10 micrograms. A pyorrheal condition and a slightly low blood count was also found to be present. She had been employed as a dial painter for about five years. About July, 1928, she began to feel tired, was dizzy, and had frequent headaches. Her menstruation became scant and irregular, and she had nervous indigestion and constipation.

Physical examination on November 28, 1928, showed her to be 5 feet 3 inches tall and weighing 153 pounds, above standard for height and age. The mucous membranes were pale and the blood count was deficient (hemoglobin 69 per cent; erythrocytes 3,680,000; leukocytes 6,000, with polymorphonuclears 73 per cent, lymphocytes 18 per cent, neutrophiles 8 per cent, and eosinophiles 1 per cent). The thyroid gland showed moderate diffuse enlargement. The case was diagnosed as secondary anemia and enlarged thyroid. Another test for radioactivity was made, showing positive, with estimated quantity of 3.6 micrograms.

*Case No. 37.*—One death had occurred in a dial-painting studio, the location of which can not be given on account of possible litigation. The deceased, M. E. X., a young women, 24 years old, had been employed as a dial painter for about 2½ years. Soreness of the jaw and swelling of the face developed. She was sent to the hospital, and died five days later. The progress of the case was very similar to others described.

*Case No. 38.*—One dial painter, M. L., a 24-year-old female, employed in a studio in Illinois, had been found radioactive in 1925 by electroscopic test. In 1928 another test was made, and she was found still radioactive. She had been employed intermittently over a period of six years. Over two years ago a tooth was removed, and her jaw was fractured. A second tooth was removed nearly a year ago, and the socket did not heal promptly. Complete information was not obtainable, and the firm protests against calling the diseased condition radium poisoning, but it seems well indicated by the electroscopic test.

*Case No. 39.*—In addition to the chemists from the New Jersey establishments, who died from the effects of overexposure to large quantities of radioactive substances, principally mesothorium, fatalities have also occurred in recent years among chemists and other workers of a Pennsylvania establishment, who had been employed in the extraction of radium. These had likewise been subject to exposure from large amounts, had worked with it during the early days when dangers were not suspected, and had consequently received severe burns on the hands. The first death among these workers occurred November 7, 1927.

G. D. K., a man 39 years of age, had been employed as chemist in extraction of radium from 1912 to 1925, during which time it is estimated that he handled about 100 grams. From then on his time was practically all taken up in the manufacture of luminous material. In September, 1926, his blood count indicated leukopenia, which was progressive and in April, 1927, blood transfusion was resorted to, and repeated monthly from then until death. Brief periods of improvement were experienced after each transfusion. The death certificate gives the cause as myeloblastic leukemia, contributed to by prolonged exposure to radium emanations.

*Case No. 40.*—The second death occurred on November 17, 1927, 10 days later. P. F. H., a 34-year-old male, had been employed as packer of radium salts from about 1914 to October, 1923. In the beginning he handled the tubes with bare hands, probably for about a year. As a consequence a squamous epithelioma developed on one finger, removed by operation in 1925. In 1923 he was transferred to other duties, on account of his blood condition. He recuperated, but grew worse three years later. He was taken to the hospital in August, 1927, but pneumonia developed, and because of the weakened condition of his system, resulted in his death. The death certificate gives cause as "Pernicious anemia," and the contributory cause as 'Lobar pneumonia—abscess of the hip, three weeks."

*Case No. 41.*—The third death occurred on April 6, 1928. C. H. V., a man of 41 had been employed as chemist in the extraction of radium since 1912. During the early days he handled a great deal, estimated in 1925 at about 99.5 grams, and personally produced more than 20 grams. During the last 10 years, however, he had handled comparatively little. Severe burns were sustained in the early years, resulting eventually in a malignant disease which necessitated removal of a finger in 1925. A year later another operation was necessary, to remove a lump in the left forearm, and afterwards another in the axilla of the arm. It was found impossible to check the progress of the disease, to which he finally succumbed. The death certificate gives the cause as "X-ray carcinoma of hands. Metastasis to chest."

*Case No. 42.*—Chemists in other places were also affected, though no further fatalities were discovered. One of these, A. L. X., a man 36 years old, started to work with radioactive substances in 1914. Up to 1925 he had handled about 30 grams. His fingers showed lesions, due to burns in the early days. His condition is not serious at present, but his blood counts show several declining periods, with tendency toward anemia or leukemia, which require vacations. He has recovered so far from each attack, but they continue to develop.

### Possible Cases

It was learned that one chemist, H. B., who also has handled considerable quantities since 1915, has been found to be radioactive. The amount was estimated at 5 micrograms. Blood affections among workers in a thoria factory were also examined, and three of these workers in one establishment proved to have developed anemia, though not severe. They were transferred to other occupations, and are said to have recovered. Two young laboratory workers were also

claimed to have been at least temporarily affected. These, as well as other uncertain cases, have not been included in the table below, which show the total numbers discovered in each class.

TABLE 4.—CASES OF POISONING FROM RADIOACTIVE SUBSTANCES AMONG DIAL PAINTERS AND LABORATORY WORKERS IN THE UNITED STATES

| Classification of case | Dial painters | | Laboratory workers | |
|---|---|---|---|---|
| | Fatal cases | Living cases | Fatal cases | Living cases |
| Radioactive origin— | | | | |
| Diagnosed | 9 | 8 | 5 | ---------- |
| Obvious, but not diagnosed | 5 | 5 | 2 | ---------- |
| Suspected | 1 | 5 | 1 | 1 |
| Total | 15 | 18 | 8 | 1 |

### Activities of State Officials

Considerable effort was made in New Jersey by the State department of labor and local health authorities to investigate and cope with the disease. The New York State Department of Labor has made several investigations of dial painters in that State, where only a few small studios were located, the results of which have not been made available. The Pennsylvania Department of Labor and Industries likewise inspected the few establishments located in that State, but found that apparently all known precautions had been applied. Studios in Connecticut had been visited by representatives of the Connecticut State Board of Health, who found that the different firms there had practically turned control of the hazards over to an expert, who visited the studios periodically, made examinations, and advised the preventive measures to be taken. It was thought that the situation was handled well. The Massachusetts Department of Labor and Industries inspected the studios in that State, and found all possible care taken. The Illinois Department of Labor, which investigated conditions in the Illinois studios, likewise found that all the safeguards which had been advocated were applied. In fact, it was practically a case of awaiting developments all around.

In the State of New Jersey, where only specific occupational diseases are recognized as compensable, "mesothorium or radium necrosis" was in 1926 added to the list, but its inclusion was practically nullified by the clause in the compensation act which provides that the disability must have commenced within five months after the termination of the exposure. No action was taken in the other States where dial painting was done, but in two of them, Connecticut and Massachusetts, all occupational diseases are compensable. In the former State this is limited greatly in poisoning from radioactive substances by the time limit in the filing of claims to one year after the first manifestations, or two years after death.

# Occupational Poisoning in Manufacture of Luminous Watch Dials [a]

## GENERAL REVIEW OF HAZARD CAUSED BY INGESTION OF LUMINOUS PAINT, WITH ESPECIAL REFERENCE TO THE NEW JERSEY CASES

By HARRISON S. MARTLAND, M. D., of NEWARK, N. J.

BECAUSE of recent newspaper publicity, the result of litigation, and the publication of scientific and lay articles, some erroneously explaining and others denying the existence of the so-called radium poisoning in watch dial painters, it seems advisable that a review of the history, symptomatology, pathology, prognosis, treatment, and scientific literature of this industrial hazard, first adequately described by me and my associates, be published at this time.

At a recent conference concerning a national survey of the watch industry for evidence of similar cases of poisoning in other States I was greatly surprised when a leading authority on industrial diseases told me that this disease was an obscure one about which little was known. I can not agree with this statement. In fact, its etiology, general and special symptomatology, pathology, prognosis, and treatment were rather fully covered in our original work in 1925,[1] and at the present time there has been little of importance added to that description.

While the exposure and the study of this new industrial hazard is of prime importance to the watch industry, to all workers with radioactive substances, and to those exposed to penetrative radiation and irradiation from gamma and Röntgen rays, its chief scientific interest is that this is the first time that the deadly alpha rays have been known to act continually on such vital centers as the blood-forming organs. All the previous evil effects of radiation recorded have been mainly penetrative in character by beta and especially gamma rays, by Röntgen rays, or by the inhalation of emanation. Its main importance in pathology is that it adds additional information to the knowledge of the obscure anemias and the understanding of the hematopoietolytic systems.

### Number of Girls Exposed in the New Jersey Cases

DURING the years from 1917 to 1924, an accumulative total of about 800 girls were employed in a factory in New Jersey painting the dials of watches and clocks with luminous paint. In the busy periods there were never more than 250 girls working at one time. Many of the girls did this work for only a short period. The pay was attractive and the work comparatively easy. It is important to note that the known cases of radium poisoning all affected the girls who had worked steadily in this plant for from one to two or more years.

Among these employees there have been 15 known deaths in which the so-called radium poisoning is strongly suspected. It was proved to be the cause of death in five cases. That other deaths have oc-

[a] Reproduced, by permission, from Journal of American Medical Association, Feb. 9, 1929, pp. 466–473, and Feb. 16, 1929, pp. 552–559: Occupational Poisoning in Manufacture of Luminous Watch Dials, by Harrison S. Martland, M. D.

[1] Martland, H. S.; Conlon, Philip; and Knef, J. P.: Some Unrecognized Dangers in the Use and Handling of Radioactive Substances: With Special Reference to the Storage of Insoluble Products of Radium and Mesothorium in the Reticulo-endothelial System. J. A. M. A. 85: 1769, Dec. 5, 1925.

curred is not at all unlikely. The late development of symptoms, often occurring from one to seven years after the patients leave the employment, and their resemblance to various other diseases would make a diagnosis almost impossible if the patients had moved to another locality. Physicians not aware of this condition might treat a victim for sepsis, anemia, Vincent's angina, rheumatism or "God knows what." How soon the true state of affairs would come to light would depend on the physician and the facilities at his disposal.

When one estimates the number of girls who worked steadily at this employment for a considerable period of time and realizes that most of the fatal and severe cases came from this group it will be seen that the incidence of this poisoning compares with that of most other forms of occupational poisoning. For instance, in phosphorus poisoning among match makers, only 1 per cent of those working in Great Britain developed necrosis of the jaw and from 1 to 3 per cent in France and Switzerland. One of the great medicolegal questions raised against the radium-mesothorium cases being occupational was, Why did not a larger number of the girls become affected? Carelessness in handling poisons, individual susceptibility, individual resistance, habits and length of exposure all play important parts in occupational poisoning, and some are not thoroughly understood. There is no way of ascertaining in these cases how many have lost their lives and how many have been permanently or temporarily harmed.

## Luminous Paint

*General principles and theory.*—Lind [2] states that while the general principles of the preparation of luminous paint have been described and known for some time, the actual methods of preparing phosphorescent zinc sulphide have not been fully described in the literature and the methods in commercial use have been carefully guarded. The following quotations are selected from the excellent summary by Lind in his book on the alpha particle:

> Certain substances, under the influence of various kinds of radiation, emit light of visible wave lengths at ordinary and at extremely low temperatures. * * * In the radium luminous paints, radium salts are intimately mixed with phosphorescent zinc sulphide, which mixture is then applied to the dial to be illuminated. These mixtures have come into extensive use on watch and clock dials, electric push buttons, etc., and during the war were widely used for illuminating dials on airplanes, battleships, or in any place where it is desired to have a feeble light not visible for more than a few yards.

This luminescence depends on the phenomenon known as scintillation, discovered by Sir William Crookes [3] in 1903. It is due to an alpha particle which consists of a helium nucleus containing two positive charges striking the crystalline, phosphorescent zinc sulphide and causing a flash.

> Scintillations can be individually observed and counted only when the number of alpha particles falling on a given area of the screen in unit time is limited. When the number is greatly increased the screen appears to the eye to be uniformly illuminated, while under the microscope the number is too great to be counted.
>
> The nature of the reaction furnishing the light is not thoroughly understood. Rutherford [4] proposed the theory that a phosphorescent substance contains

[2] Lind, S. C.: The Chemical Effects of Alpha Particles and Electrons, ed. 2, New York, Chemical Catalog Co. (Inc.), 1928, pp. 63–68.
[3] Crookes, William: Proc. Roy. Soc. 71: 405, 1903.
[4] Rutherford, E. E.: Proc. Roy. Soc. 83: 561, 1910.

initially a large number of "active centers" or molecular aggregates which are disrupted by alpha particles with the emission of light. Rutherford has calculated that a single alpha particle destroys all the centers in its path within a radius of $1.3 \times 10^{-7}$ cm. for ZnS.

Without going into further detail, it becomes apparent that after the luminous paint has been applied there will be a constant decrease in luminosity as weeks and years go by, owing to a decay of the zinc from constant disruption by the bombarding alpha particles and also to weakening in the radioactive substances used by reason of their natural and uninfluenceable decay. In the average watch this luminosity is greatly impaired in about three years with the radium-mesothorium mixtures.

On account of the long life of radium (half period rate, 1,750 years) and the consequent waste in applying it to a dial the use of which is limited to a few years, Moore,[5] in 1918, proposed that the corresponding member of the thorium series, mesothorium, be used, which has a half period of 6.7 years. Mesothorium paints have come into general use and have proved effective for a period sufficient for all practical purposes. Mesothorium itself emits no alpha radiation, which must be generated by the growth of radiothorium with a half period of 1.876 years, which involves the disadvantage of requiring the "ripening" of mesothorium salts for one or more years before using, but the advantage that, if used before alpha radiation attains a maximum, its growth will, in part, compensate the deterioration of the ZnS. The use of radiothorium for luminous paints has become common in the watch industry.

In the manufacture of luminous paint the preparation of the phosphorescent zinc sulphide is most important. The phosphorescent qualities of zinc sulphide (Sidot's blende,[6] hexagonal ZnS) depend on its proper treatment by heat and on the presence of certain impurities. "The heat treatment consists in raising the ZnS mixture for a limited time out of contact with the air to a temperature at which incipient crystallization begins." From 900° to 1,100° C. at least is necessary for the best results. The crystalline structure should be distinct after cooling. It was found, too, if the "ZnS was pure that the heat treatment would not develop any phosphorescent properties toward ordinary light and only a faint luminescence under large quantities of radon unless certain impurities were added. * * * The admixtures which have been mentioned as advantageous are manganese, copper, or bismuth salts, sodium chloride, and salts of rare earths." These are added in very minute quantities. Neutral salts are often added to camouflage the presence of the effective agents.

*Character of the paint used.*—Of course the detailed preparation of the paint used in these cases has for purely commercial reasons never been published. It is possible, even probable, that its ingredients and formulas change from time to time. According to my information, however, an average paint used during this period on watches consisted mainly of crystalline zinc sulphide (ZnS, Sidot's blende) mixed with various proportions of radium, mesothorium, and radiothorium in order to obtain the desired amount of luminosity. The pure zinc sulphide was prepared by repeated roastings and reprecipitations, and to this was added small amounts of cadmium, copper, and manganese to give better luminescence. To this emulsion a soluble radioactive salt was added which was then precipitated out as an insoluble sulphate by the alkaline sulphate. The fact that the

[5] Moore, R. B.: Bull. Am. Inst. Min. Met. Engs., August, 1918.
[6] Sidot, T.: Compt. rend. Acad. d. sc. 63: 188, 1886.

final paint contained radioactive substances in the form of insoluble sulphates is of extreme importance throughout the study of the whole disease, and the prognosis and treatment depend chiefly on this fact. Radium sulphate is from one to two hundred times more insoluble than barium sulphate, and the latter is soluble only with great difficulty.

"Paints applied to watches and clocks contained an average of 1 mg. of radium element or its equivalent to 30–40 gm. of zinc sulphide." Flinn [7] has stated that the strengths of the paints used varied from 0.7 to 3 and 4 mg. of radium element to 100 gm. of the zinc sulphide. This practically agrees with the estimated strengths given by us [1] in 1925. Flinn [7] has also stated that the amounts of impurities added to the zinc sulphide were cadmium, 0.05; copper, 0.001; and manganese, 0.0002 per cent. This is given to show that no toxicologic effects might be expected from such small amounts of these substances, none of which have ever played a prominent rôle in industrial toxicology.

In the beginning the zinc sulphide was rendered luminous by activation with radium. Later, for economic reasons and because of greater practical luminosity, mesothorium and radiothorium were substituted for the more expensive radium. The mesothorium contained radiothorium in equilibrium, or artificially added, to obtain maximum ionization and luminosity.

The paint used by the girls contained, therefore, chiefly zinc sulphide tendered luminous by activation with about 20 to 30 per cent of radium and from 80 to 70 per cent of mesothorium containing radiothorium. But doubtless this percentage varied from time to time. This is most important in view of the fact that later, in the extraction from the bones in the fatal cases, mesothorium and its decay products were found greatly in excess of the radium in four of my cases, while in the case recorded by St. George and Gettler only radium was found.

In addition, the preponderance of mesothorium is of great toxicologic importance, since we [1] called attention in 1925 to the fact that mesothorium in equilibrium with its radiothorium emits five alpha particles, whereas radium emits only four, and that the alpha particles of mesothorium and its decayed products have a greater velocity and penetration than those of radium, and therefore are chemophysically and physiologically more active.

As to whether certain ingredients of the paint other than the radioactive substances were responsible for the symptoms in these cases, it may be stated that there is no previous knowledge or record of chronic poisoning due to the cumulative effects of zinc, copper, cadmium, and manganese showing anything like the clinical pictures seen in these cases.

As zinc is the main chemical constituent of the paint, it is, of course, under suspicion. However, it is generally conceded that zinc per se is nonpoisonous.[8]

Michaelis [9] asserts that zinc is a normal constituent of human tissues. The most common type of zinc poisoning in industry is that

[1] Journal of American Medical Association, 85:1760, Dec. 5, 1925.
[7] Flinn, F. B.: Radioactive Material an Industrial Hazard? J. A. M. A. 87: 2078–2081, Dec. 18, 1926.
[8] Rambousek: Industrial Poisoning, translated by Legge, 1913, p. 151.
[9] Michaelis, quoted from Hill in the Reference Handbook of Medical Sciences 8: 339.

due to the inhalation of fumes and ingestion of dust during the process of smelting and vaporizing impure zinc, known as spelter, or of smelting brass which contains about 50 per cent of zinc. "Spelter chills" and "brass founders' ague" are characterized by chilly sensations, rigors, pains in the limbs, diarrhea, and prostration quite unlike anything seen in these cases. While longevity may be shortened in these occupations there is no evidence of any direct cumulative effect. I have been informed by Wilbur,[10] who for years was physician to the New Jersey Zinc Co., one of the largest zinc mines and extracting plants in the East, that he had never seen any ill effects from zinc, even in the zinc sulphide department, in which men were constantly exposed to large amounts of zinc dust by inhalation and ingestion. There have been cases of manganese poisoning. The ore at this mine is practically free from arsenic and lead but contains considerable manganese. These cases were described by Casamajor.[11] They were characterized by the development of a clinical picture not unlike that seen in paralysis agitans or the late manifestations of epidemic encephalitis. As the cases appeared before 1913, epidemic encephalitis as an etiologic factor is ruled out.

There is considerable doubt as to whether a chronic poisoning from copper exists. Such cases as are reported are usually due to impurities from phosphorus, arsenic, antimony, lead, or mercury. Whether copper per se is toxic is still unsettled. It is worthy of note, however, that Mallory, Parker, and Nye [12] have shown that hemochromatosis is due to chronic copper poisoning. They have produced experimentally pigment cirrhosis by feeding copper salts. Of course, the symptoms of this disease and its pathology do not have any resemblance to those of radium poisoning.

The reported cases of cadmium poisoning occurred chiefly in the smelting of zinc, and the main symptoms were referable to the gastrointestinal tract and peripheral nervous system. They usually resemble cases of lead poisoning but there is no typical colic.

*Mode of application of paint.*—The paint was mixed with acacia and thinned out with distilled water and was given to each girl in a porcelain crucible containing about 10 c. c. of the mixture.

It was the habit of most of the girls who were doing piecework to point the camel-hair brushes used in painting with their lips, as quicker and more accurate painting could thus be performed. We had assumed in 1925, as a basis for argument, that a girl painting 250 watches a day and licking her brush once for each dial might possibly ingest a minimum of about 125 mg. of the paint. If she pointed her brush fourteen times per dial (one girl stated that she often licked her brush twice for each watch figure), she might ingest about 1.75 gm. of paint a day. Working throughout the week, it was possible, therefore, for a girl to swallow from 15 to 215 micrograms of radioactive substances during a week.

The only other estimate known was made by Flinn,[7] in 1926, one year after our publication, in which he stated that assuming that a girl used about 10 gm. of paint a week, or more, depending on the work,

[7] Flinn, F. B.: Radioactive Material an Industrial Hazard? J. A. M. A., 87:2078–2081, Dec. 18, 1926.
[10] Wilbur, Frederick: Personal communication to the author.
[11] Casamajor, L.: Fifteenth Int. Cong. on Hygiene and Demography, part 2, 3: 574.
[12] Mallory, F. B.; Parker, Frederick, jr., and Nye, R. N.: Experimental Pigment Cirrhosis Due to Copper and Its Relation to Hemochromatosis. J. M. Research 42: 461, October–December, 1921.

she might ingest, if she was careless, 0.5 gm. for every 10 gm. of paint used, or about 0.5 gm. of paint a week, which would contain about 7.2 micrograms of radioactive substances. His estimated amount is about one half of our estimated minimum. Of course, these are only guesses. The important facts are that he admits the licking of the brushes and the possibility of ingestion of a paint containing radioactive substances, further stating that from 15 to 20 micrograms might remain in the intestinal tract continually if the girl was working steadily.

Hoffman,[13] in May, 1925, was the first to call attention to this habit of licking brushes. Speaking of 12 cases that he reported, he states:

> There is some question of doubt as to whether they were instructed to do their work this way or whether they worked contrary to instructions. They certainly seemed to have copied the habit one from another and found it decidedly convenient, the brush being better adapted to the purpose when penciled to a fine point with the lip.

He also stated that the paint contained mesothorium.

## Chronological Order of Events in the New Jersey Cases

*Early deaths.*—In 1922, 1923, and 1924, nine girls died who had been employed as watch-dial painters in this plant and who had worked steadily for years at this employment.

Absolutely no investigations were made in any of these cases as to the cause of death. The death certificates were signed by the family physicians, and some of the following conditions were given as the cause: Ulcerative stomatitis, syphilis, primary anemia, Vincent's angina; phosphorus poisoning, necrosis of the jaw; occupational poisoning (character unknown), necrosis of the jaw; anemia; necrosis of the jaw. It is impossible to obtain any data in these cases as to the special symptomatology, or any blood studies on the type of anemia. Autopsies were not performed. In fact, except for slight suspicion on the part of a few family physicians that something was wrong, no medical recognition of the existence of an occupational poisoning was recorded. The material represented by these cases is therefore wasted, with the exception of one case. In this case, which was one of the first to terminate fatally in 1922, the body was exhumed five years after death for litigation purposes. Gettler found undisputed evidence of radioactivity in the bones.

*Treatment by dentists.*—During this time, local dentists were treating a considerable number of girls employed, or who had been employed, by this plant for various degrees of jaw necroses, many of which were resistant to the usual forms of treatment. There is no way of determining the number of girls treated, but the assumption of about 50 would not be an exaggeration.

*First recorded suspicion of the existence of an occupational disease.*—Blum,[14] a New York dentist, is to be credited with the first report indicating that an occupational form of poisoning existed. He reported in September, 1924, a case of unusual and intractable osteomyelitis of the mandible in one of these girls. He knew nothing regarding the nature of the paint or industry, but thought from the

[13] Hoffman, F. L.: Radium (Mesothorium) Necrosis, read before the Section on Preventive and Industrial Medicine and Public Health, May 29, 1925.

[14] Blum, Theodore: Osteomyelitis of the Mandible and Maxilla, read before the American Dental Association in September, 1924.

unusual clinical behavior that some sort of occupational poisoning existed.

*Investigation by lay and civic bodies.*—In 1924 the Consumers' League of the Oranges called the attention of the State department of labor to the objectionable fumes coming from the plant and the possibility of an occupational poisoning. An investigation was made but with entirely negative results. The United States Public Health Service had briefly considered the matter but did not make an investigation.

*The Hoffman report.*—In 1925 Hoffman, whose attention was called to the plant by the New Jersey Consumers' League, found that there was a great similarity in the reading of the death certificates of deceased former employees. Most of them mentioned jaw necroses, anemias, and buccal lesions. He thought that from a statistical standpoint the matter should be investigated. In May [15] and September,[13] 1925, he reported, from the statistician's point of view, 5 deaths and 12 cases occurring among girls still alive who had developed a resistant infection of the jaw with buccal lesions and a marked anemia. He was of the opinion that they represented an unusual occupational poisoning, and thought that mesothorium in the paint was mainly responsible and that there was an ingestion of this paint as a result of the habit of licking the brushes. This is the first recorded report of the nature of the disease. In the investigation he was greatly aided by the experience of Von Sochocky, who was intimately acquainted with conditions at the factory. No description of the types of anemia or other symptomatology was given, and as there had not been any autopsies there were no records of pathologic changes, and the subject was unproved.

*The Castle and Drinker report.*—During this time the factory executives had undertaken an investigation of their own to determine whether any occupational hazard existed. This was made by Castle and the Drinkers [16] in March, 1924. Unfortunately, at the request of the company, this report was not published on account of threatened litigation until August, 1925. According to my information these investigators were asked to ascertain whether there was any evidence of zinc poisoning and to comment on the general hygiene of the plant. Nothing was told them about mesothorium. They inspected the factory and the employees and concluded that there was undoubtedly proof of excessive exposure to radiation. Sealed dental films when placed in any part of the factory showed fogging in from one to two weeks and in the painting room in from two to three days, showing exposure to gamma radiation. The skin, dresses, and underwear of many girls when examined in a dark room showed the presence of phosphorescent zinc sulphide and appeared luminous. Dust collected from the chandeliers, wall beams, and even in the offices when exposed to light was luminous in the dark room, showing the presence of the zinc sulphide. Samples tested later for radioactivity were positive. While they considered the skin and gastrointestinal tract as probable portals of entry, they concluded that undue exposure to radioactive substances existed, chiefly from the inhalation of particulate material

[13] Hoffman, F. L.: Radium (Mesothorium) Necrosis, read before the Section on Preventive and Industrial Medicine and Public Health, May 29, 1925.

[15] Hoffman, F. L.: Radium (Mesothorium) Necrosis. J. A. M. A. 85: 961, Sept. 26, 1925.

[16] Castle, W. B.; Drinker, Katherine R.; and Drinker, C. K.: Necrosis of the Jaw in Workers Employed in Applying a Luminous Paint Containing Radium. J. Indust. Hyg. 7: 371, August, 1925.

containing a radium salt. They did not ascertain the presence of mesothorium. They stated that the habit of pointing brushes in their mouths had been general among the employees, but was stopped six months before the investigation started. They concluded that the implication was not proved, but the safest course would be to assume that an occupational poisoning existed. They made recommendations for the future protection of workers. The main value of this report is that it came from the factory's side and demonstrated without a doubt that all the girls employed as dial painters were subjected to excessive exposure.

*First patients examined.*—In May, 1925, I examined two girls with extensive jaw necrosis and severe anemia. Both patients died and I performed autopsies. At the same time I saw in consultation the company's physicist, who was suffering from a profound anemia, apparently of the regenerative type. He died soon afterwards and I performed the autopsy. These were the first autopsies made in such cases.

*Original report.*—In October, 1925, I [17] first reported the etiology, symptomatology, pathology, diagnosis, and treatment of this new occupational disease. This report was based on the first two autopsies performed and the study of five living patients in whom a diagnosis of the condition was made for the first time by detecting emanation in their expiratory air. The method by which the radioactive substances entered the body, the chemical form in which they were ingested, the storage as insoluble sulphates in particulate form in the bones, liver and spleen, and the importance of the histiocytes of the reticulo-endothelial system in this storage, the methods of recovering them from the organs, their demonstration after death by photographic and electroscopic methods, their demonstration during life by means of the expiratory air test, the type of anemias encountered, the gross and microscopic pathologic changes of the disease and its prognosis and treatment were all described for the first time.

This work was based on my investigations as chief medical examiner of Essex County and was undertaken independently of all other investigations and according to my own views of what my duties were. One of the main functions of the medical examiner is to prevent the wastage of human life in industry. These investigations were unasked for and uninfluenced by any civic or other body. I feel that, as a result of this investigation, the disease was for the first time put on a firm scientific basis.

*The Martland, Conlon, and Knef report.*—In December, 1925, Conlon, Knef, and I [1] enlarged on my original report, giving in detail the history, symptomatology, pathology, and prognosis in this disease. Radioactivity was demonstrated during life by showing the presence of emanation in the expiratory air, and after death by photographic and electroscopic methods. The case of a girl apparently in perfect health was reported to show the difficulty in diagnosis; this girl had emanation in her expiratory air. At the present time she is a victim of chronic bone lesions of a crippling nature. The report gives for the first time a detailed recital of the disease, which picture is not likely to be added to or changed. Attention was called to the dangers

[1] Journal of American Medical Association, 85: 1769, Dec. 5, 1925.

[17] Martland, H. S.: Some Unrecognized Dangers in the Use and Handling of Radioactive Substances, with Special Reference to the Storage of Insoluble Products of Radium and Mesothorium, etc., in the Reticulo-Endothelial System, read before the New York Pathological Society, October 8, 1925.

of intravenous therapeutic injections of radioactive substances. Even when soluble bromides or chlorides of radium or mesothorium are used, they are precipitated in the blood stream as insoluble sulphates and may accumulate in the organs of the reticulo-endothelial system as fixed deposits.

*Another fatal case.*—In October, 1926, I[18] reported the death of another girl, described as having the disease in a chronic form in our[1] report, in whom a more careful chemical extraction from the bones showed a total of 150 micrograms deposited in the skeleton, of which about 70 per cent was mesothorium and its derivatives. Accurate photographic work was done and autohistoradiographies were made after the method of Lacassagne showing the irregular distribution of the deposits in the bones. The character of the anemia was more minutely described.

*The Reitter and Martland report.*—In August, 1926, Reitter and Martland[19] reported the death of a chemist and physicist employed in the same plant as the girls. Before protective measures were used, he openly handled radioactive substances, often being exposed to untubed radioactive elements. He had been exposed to radiation in the following ways: through inhalation of gaseous disintegration products of radium and mesothorium; through inhalation of dust particles in the atmosphere of a room in which products were weighed, tubed, and retubed; through exposure to alpha, beta, and gamma rays from solid preparations prior to sealing, and through exposure to gamma rays from hermetically sealed preparations. While at work and apparently in good health, the patient suddenly developed an acture leukopenic anemia of the regenerative type, dying one month after the onset of symptoms. This was the first case that I examined at autopsy in May, 1925, but unfortunately the report was held up at the request of the factory on account of threatened litigation.

The organs were tested by Barker, the chief physicist of the plant. He found 14 micrograms of radioactive elements in the skeleton. Approximately 5 per cent was due to radium, the remainder being made up of the alpha radiation from mesothorium and the decay products of radium and mesothorium. One microgram was recovered from the lungs (the main mode of entrance in this case). It was believed that this was the first case in which complete quantitative tests for radioactivity in human tissues had been made post mortem, although in 1913 Cameron and Viol[20] had made quantitative tests of the organs of a patient dying from cancer three and one-half months after the experimental intravenous injection of 1 mg. of radium element. The largest amounts were found in the bone marrow, liver, and lungs. Reitter and Martland concluded that complete protective measures must be installed in all manufacturing plants, laboratories, hospitals, and private offices in which radioactive substances are handled.

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[1] Journal of American Medical Association, 85: 1769, Dec. 5, 1925.

[18] Martland, H. S.: Microscopic Changes of Certain Anemias Due to Radioactivity, Arch. Path. & Lab. Med. 2: 465–472, October, 1926.

[19] Reitter, G. S., and Martland, H. S.: Leucopenic Anemia of the Regenerative Type Due to Exposure to Radium and Mesothorium. Am. J. Roentgenol., 16: 161–167, August, 1926.

[20] Cameron, W. H., and Viol, C. H.: Classification of the Various Methods Employed in the Internal Administration of Radium Emanation and Radium Salts. Radium, 4: 66, January, 1915.

*Flinn's first report.*—In December, 1926, Flinn[7] reported his observations in these cases. He describes the composition of the paint used and its method of application, and admits that it had been the custom to point the brushes, after dipping them in water, by drawing them between the lips.

He speaks of five deaths in the preceding four years among girls employed in this plant as dial painters, who had developed necrosis of the jaw following the removal of a tooth or dental intervention and accompanied by severe anemia terminating in death.

As regards the jaw necrosis, he argues that the gelatinous liquefaction noted in these cases suggests bacterial invasion and is in marked contrast to the bony disintegration seen in phosphorus poisoning. He does not believe that the necrosis can be explained by the lodging between the teeth or on the roof of the mouth of particles of radioactive substances, but does admit that particles may penetrate into the cancellous structure of the bone through open spaces caused by pyorrhea.

In his experimental work he has shown that when the girls used a cloth instead of their lips for pointing a considerable measurable amount of radioactive substance was deposited in the cloth after the brush had been washed in water. He believes, however, that, if this was swallowed, 98 per cent would be excreted in a few days after the exposure ceased.

He states that inquiries in this country and in Europe fail to reveal a single case of jaw necrosis outside the Orange cases, and that "the pointing of paint brushes in the mouth proved to be a common habit in all factories inspected here and abroad." Yet Lacassagne[21] has stated that the disease is not observed among the watchmakers of Switzerland and France because they use rods in putting the illuminating substance on dials.

Flinn concludes that "an industrial hazard does not exist in the painting of luminous dials. The only evidence contrary to this conclusion rests in the fact that five employees at the plant in Orange, N. J., have died from some cause that can not be determined at this date."

He further states:

> The girls who died all worked together at the same bench some time between the years 1917 and 1923. A diagnosis of syphilis as a contributing factor appears on the death certificate of one of them. * * * A brother of another has suffered from an obstinate pathologic jaw condition. He never came into contact with radioactive paint. In other words, the cases were not clear cut. Vincent's angina has been known to produce a similar pathologic picture, ending sometimes in death. Bacterial infection has not been ruled out in a satisfactory manner. * * * The five cases reported suggest bacterial invasion and were complicated by syphilis, joint trouble, and Vincent's angina.

The only reference made to the literature directly bearing on the cases was the Drinker report. The Flinn dictum beclouds the issue by confusing the jaw necrosis with that due to syphilis, Vincent's angina, phosphorus, and arsenic, and the introduction of a peculiar bacterial infection that occurred in the girls because they worked in the same room and frequently used one another's brushes.

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[7] Flinn, F. B.: Radioactive Material an Industrial Hazard? J. A. M. A. 87: 2078–2081, Dec. 18, 1926.

[21] Lacassagne, A.: Un nouvel accident professionel des manipulateurs de corps radioactifs: La necrose des maxillaires. Paris méd., 16: 132, Feb. 6, 1926.

Concerning Vincent's angina, it has been my experience that death from this infection is extremely rare. Many of the cases reported are secondary infections with the organisms of Vincent superimposed on buccal lesions that have as their underlying cause an aplastic anemia, an acute leukopenic leukemia or similar conditions which have been unrecognized.

Flinn's work is of considerable importance, however, since at this time he admits that the girls pointed the brushes with their lips; that the paint used contained radium or mesothorium; that the method by which it was applied made possible the ingestion of small amounts of radioactive substances; that the girls in this particular plant worked a sufficiently long time to allow the ingestion of a considerable amount of the paint, and that, although 98 per cent of the radioactive substances ingested would probably be eliminated within a few days, a small amount remained in the body.

*Flinn's second report.*—In May, 1927, Flinn [22] reported the case of a dial worker in a Connecticut plant who was first seen by him in June, 1926. She had painted dials for 14 months during 1921 and 1922. In 1924 she tripped and snapped a femur without actually falling to the floor. This had to be refractured and reset. When she was seen by him a swelling was present over the ramus of the inferior maxilla on the left side which had followed the recent extraction of teeth for pyorrhea. A Röntgenogram showed bone necrosis.

The expiratory air showed the presence of emanation. A gamma electrometer, when placed close to the body, showed gamma radiation, which was estimated as about 100 micrograms in the entire body. After the administration of ammonium chloride for four days this was reduced to 86 micrograms. The patient had a low blood pressure. A profound anemia was present, characterized by slight anisocytosis, poikilocytosis, and polychromatophilia. The hemoglobin was 35; erythrocytes numbered 3,100,000, and leukocytes 6,100, with 64 per cent polymorphonuclears. She developed suppuration in the antrum. After a heavy cold the condition became progressively worse and she died in January, 1927.

Autopsy did not reveal any other abnormality than that the bone marrow presented the same general condition that is found in chronic benzene poisoning.

This case was followed by a second one occurring in the same plant. Flinn says:

> In view of the evidence in front of me I feel that radium is partially if not the primary cause of the pathological condition described. * * * If the presence of small amounts of radium in the body will produce such profound systemic changes as to lower the body's resistance to the extent indicated in these cases, one can not but view with alarm the intravenous injection or internal administration of radioactive material. If radium has affected any one who has had such treatments, the action of the radium may have been masked by the other complications. * * * It may be that a constant exposure of the hemopoietic system to these small quantities of radium may in time result in a lowering of the body resistance to infection. Radium deposited in the bone may bombard the marrow continuously with powerful alpha and beta rays.

*Flinn's third report.*—In January, 1928, Flinn,[23] in discussing some newer industrial hazards and in speaking of the radium cases, says:

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[22] Flinn, F. B.: A Case of Antral Sinusitis Complicated by Radium Poisoning. Laryngoscope 37: 341-349, May, 1927.

[23] Flinn, F. B.: Some of the Newer Industrial Hazards. Boston M. & S. J. 197: 1309-1314, Jan. 12, 1928.

At the time the first case was referred to me from Connecticut, I had examined practically every girl now working in this industry in this country, and had others examined for me in England, besides making inquiries in other countries, and had come to the conclusion that the deaths in Orange might have been caused by some bacterial infection, especially as all the girls affected had worked at the same time in the same room. I was unable to find one case either in this country or in Europe, except those which appeared in New Jersey. I reported my findings in the Journal of American Medical Association, but before the article was published the two cases occurred in Connecticut. * * * These two cases, appearing in another State from the first cases, have caused me to suspect that radioactive material is at the bottom of the trouble even if the mechanism by which it is caused is not altogether clear and not previously suspected.

It is worthy of note that not only were these cases suspected by Hoffman, Castle, and the Drinkers in 1925, two and one-half years before these statements by Flinn, but the disease was accurately described in all its features by me and my associates two years before Flinn finally made the foregoing admissions.

*Bone sarcoma.*—In March, 1928, I [24] recorded the death of another girl who had worked at this plant eight years before. Fourteen months before her death she fell and injured her right shoulder. Six months before death she developed an osteogenic sarcoma of the right scapula from which she died, following an operation for relief of pain. She had never had any severe jaw necrosis but had had evidence during life of a radiation osteitis in the right scaphoid bone, both humeri and the glenoid cavities. Autopsy showed an osteogenic sarcoma invading the muscles of the back, but no internal or bone metastases, and with this there was a profound anemia of the leukopenic regenerative type with the red marrow similar to that seen in the other cases of radium poisoning. It was estimated that her skeleton contained about 50 micrograms of radioactive substances in which mesothorium predominated. I interpret the sarcoma as possibly arising in a bone in which a previous radiation osteitis had existed for some time as a result of deposits in the skeleton. In reviewing the 15 fatal cases I had found evidence that 1 of the early cases had been diagnosed as sarcoma of the femur from the clinical course and the Röntgen examination, and had been treated by high-voltage Röntgen therapy. This was never proved, however, at autopsy. The incidence of two osteogenic sarcomas in 15 patients dying as the result of an occupational poisoning by radioactive substances is too high to be mere coincidence.

### Death, from Aplastic Anemia, of Originator of Formula Used at New Jersey Plant

NOVEMBER 14, 1928, Dr. Sabin A. von Sochocky died of an aplastic or aregenerative anemia. Von Sochocky had formerly been a technical director in the company in which these cases occurred. While the general principles of luminous paint are well known, each plant had its own formula which was a commercial secret. The paint used by these girls was mainly Von Sochocky's formula.

From 1913 to 1921 he had been exposed to intense radiation from radioactive substances, during which time he had personally extracted about 30 gm. of radium from the ore, being exposed continually to

[24] Martland, H. S.: Osteogenic Sarcoma of Scapula Occurring in a Woman Having Previous Radioactive Deposits in Her Body. Read before the New York Pathological Society at the New York Academy of Medicine, Mar. 8, 1928. To be published in full in Archives of Pathology.

heavy penetrative radiation. He was exposed to the inhalation of dust in the crystallizing laboratories. From 1919 to 1920 he was exposed to heavy radiation in a small room from large amounts of emanation by inhalation and ingestion and to highly concentrated dust from radium, mesothorium, and the like. On four occasions he was exposed to explosions of tubes containing high concentrations of radium and mesothorium.

Since 1921 he had occasionally been exposed to external penetrative radiation from radium used for therapeutic purposes.

He had an extensive radium dermatitis of the fingers of both hands. He also had considerable jaw necrosis with buccal lesions, and at times was quite anemic. However, he was able to combat the anemia and buccal sepsis by hygienic measures and by living at times in high altitudes.

In 1925 he gave me considerable advice with regard to measuring the amounts of radioactivity in the bones at autopsy. In June, 1925, while testing some of the living patients and devising a technic for the expiratory air test as a control in one of our experiments, we tested his expiratory air for emanation and found larger amounts than in any of the living patients. Later, when he blew his expiratory air over a screen of phosphorescent zinc sulphide, scintillations were seen, too numerous to be counted. At this time he realized his condition and its apparent hopelessness but was stoical to the end.

He was in a fair state of health and able to do his work until August, 1928, when he became extremely weak, pale, and dyspneic. Blood examination showed hemoglobin, 28 per cent; erythrocytes, 1,720,000; leukocytes, 4,000, with polymorphonuclears, 48 per cent. Blood platelets were scant. Practically no reticulocytes were present. The red cells were regular in size and shape and showed no polychromatophilia. From this time until he died, three and one-half months later, the clinical picture was typical of the terminal stage of an aplastic anemia. He was kept alive by 13 blood transfusions given at intervals of from eight to three days, and in amounts from 450 to 900 c. c. The transfusions would not hold more than four days and the last two were of no benefit. For two and one-half months his blood platelets were under 40,000 per cubic millimeter and practically absent in the smears. Yet aside from a fine purpuric rash over the extremities which would appear in crops, there was no bleeding until the last. On one occasion the icterus index was 6.8 and there was a slight indirect Van den Bergh test. Blood cultures were repeatedly negative. Finally the leukocytes would vary from 1,800 to 2,500 with scarcely any polymorphonuclears near the end. Various forms of treatment, including large and extended use of raw and cooked liver and active fractions (liver extract), had no effect, the liver diet producing only an occasional reticulocyte in the blood smear. Just before death he developed a septic broncho-pneumonia, retinal hemorrhages, hemoptysis, and hematuria.

He died a horrible death, similar to that seen in chronic benzene poisoning, the acute leukemias, and other acute blood dyscrasias. During the time I knew him he gave all that was in him to help and comfort others suffering from this disease. Without his valuable aid and suggestions we would have been greatly handicapped in our investigation.

## Litigation

In 1926 two of the fatal cases in which I had performed the autopsy were settled out of court without the company assuming any legal responsibility. The families of the two girls received a lump sum of money approximately equal to what they would have received under the compensation act, which arrangement was to extend over a period of time. Of course, the attorney extracted his usual fee.

In May, 1927, suit was started in the supreme court by five girls said to be suffering from this disease. This was made known to the public through the newspapers as "The case of the five women doomed to die." It is of great medicolegal importance and will therefore be briefly discussed. I had no interest in either side but was subpœnaed by the plaintiffs as a county official, and refused to accept more than the sum of 50 cents customarily tendered with the service of a subpœna.

I shall try to bring out the shortcomings of the present compensation law and show the impossibility of obtaining compensation for occupational diseases unless the disease is specifically included in the law.

After suit was started the defense pleaded that the statute of limitations [25] barred action and the women's counsel was compelled to transfer the case to the chancery court [26] in July, 1927. The case was continually postponed and no hearings were held until January 12, 1928. After three days the hearing was adjourned to April 25, when it was again continued for three days. The plaintiff's case being in, further hearings were then put off until September 24. Shortly after an editorial appearing in the New York World, which stated that "this is one of the most damnable travesties on justice that has come to our attention," it was decided that the case never belonged in chancery and should go back to the supreme court for trial.

At last everything was ready for the trial, even the sob writers, when suddenly an uninvolved judge, out of the kindness of his heart, believing that there should be some relief for the girls and that the case might drag on for years in the courts, arranged a settlement out of court. The company again did not assume any legal responsibility that the cases arose from occupational poisoning. Great credit was given this judge for his very humanitarian act.

In a recent review, De Laet [27] cites the cases of the five New Jersey girls as the only known instance in which persons injured from the handling of radioactive substances have received compensation. He says that these cases have no medicolegal precedent.

The settlement is unique. The girls received a definite sum of money and will have a yearly pension as long as they live, or as long as a committee of three experts decides that they are still suffering from radium poisoning. One member of the committee was selected

[25] A New Jersey statute of limitations says that suit for damages must be brought within 2 years after inception of the disease. If this law was pleaded and upheld these girls would not have been entitled to bring suit, as most of them did not develop symptoms or realize that they were suffering from this disease until 5, 6, and 8 years after its inception.

[26] Literally, the Court of King's Conscience dating from the early eighteenth century. Chancery had jurisdiction when there were no forms of action by which relief could be obtained at law, in respect of rights that ought to be enforced. Said King James, speaking in the Star Chamber: "Where the rigor of the law in many cases will undo a subject, then the chancery tempers the law with equity, and so mixes mercy with justice, as it preserves a man from destruction."

[27] De Laet, Maurice: La pathologie professionelle due aux corps radioactifs. Ann. de méd. légale, October, 1928, pp. 442–452.

by the company, one by the girls, and the third by the other two. Two members of the committee will constitute a majority. No mention was made of mesothorium and no explanation of the omission was offered.

Three of the five girls had been examined by me in 1925 and showed evidence of radioactive deposits in their bones and emanation in their expiratory air. At this time they were in rather good physical condition. In fact, one girl who we predicted might have trouble in the future was reported in our original paper [1] as a "healthy case" on whose life any insurance company would have issued a policy. This girl now has bone lesions of a crippling nature and a moderately severe anemia. Only one of the five girls has had any severe necrosis of the mandible. This patient still has jaw necrosis, which has already necessitated about 20 dental operations. At this time she has discharging sinuses below the chin which will not heal. Of the five girls it would seem that this one is the most likely to die, as the danger of added buccal sepsis is always present. In addition, she has had a destructive lesion in the lower part of the dorsal spine behaving clinically like Pott's disease, but quite different Röntgenographically. She also has an osteitis in the scaphoid bone of the left foot, which is due to radiation from deposits in this bone, producing pain and giving definite Röntgenographic evidence of the lesion. Two other girls have the same osteitis localized in the scaphoid bone. Two others have similar radiation osteitis in the head of the femur, producing a coxa vara with marked shortening. One girl has had a spontaneous fracture through the upper third of the femur producing extensive crippling. At the present time she has a moderately severe anemia. When the litigation started I told the lawyers plainly that I would not be used as an expert and would appear in court only on subpœna as a county official. I also told them I would no longer take part in the medical examinations of living persons, but that if any died under my jurisdiction I would be bound to investigate the cause of death. The medical care of these girls was then taken over by Doctors St. George and Humphries, Gettler being asked to do the chemophysical work with Mrs. Hughes, a physicist. Dr. Charles Norris rendered valuable aid as a consultant. Such a state of affairs existed until the settlement was made. The future medical care of these girls is under an appointed committee (Doctors Craver, Krumbhaar, and Ewing), no member of which has had any previous connection with them. I have been present, however, at several examinations of these girls since the litigation started but have not taken an active part.

The clinical picture in these five girls is a little different from that in the early fatal cases. None have developed so far the profound anemias seen in the early cases. All but one have recovered from, or have never had, the necrosis of the mandible and maxillæ that was such a prominent feature of the early cases. They seem to be suffering chiefly from the effects of radiation osteitis, more or less localized in such bones as are subject to external trauma or pressure, such as the scaphoid bones of the feet or the bones that bear considerable weight, such as the lower dorsal and lumbar spines, the heads of the femurs, the humerus and the glenoid cavities. The effect has been to

[1] Journal of American Medical Association, 85: 1769, Dec. 5, 1925.

produce chronic bone lesions, with pain, limitation of motion and a consequent crippling effect. Two of the girls can not walk and practically have to be carried.

To what, then, is this different clinical picture due? The most feasible explanation would seem to be that a sufficient length of time has elapsed to allow the mesothorium, which forms the largest part of the deposits, to decay in its own natural, uninfluenceable manner, and that these girls may escape the fatal anemias and sepsis seen in the earlier cases.

Before the final hearing in chancery, I had the opportunity of witnessing an examination of these patients by the company's experts, in the presence of experts representing the plaintiffs. At this examination the only test made to determine whether the girls were radioactive was to have them sit in front of a gamma electrometer. The instrument used was said to be unaffected by atmospheric changes. This electrometer was supposed to detect penetrative rays coming from a living body thought to contain deposits of radioactive substances, chiefly in the bones. The total amount distributed throughout the skeleton was probably below 10 micrograms, and 95 per cent of the radiation coming from these deposits was alpha. In addition, important parts of the body, such as the tibia and femurs, which would contain a large amount of the radioactive substances, were from 2 to 3½ feet away from the instrument, allowing what little gamma rays were given off to be almost entirely absorbed by the body flesh. The readings were made by Schlundt and Flinn for the company, and separate readings were made by Mrs. Hughes and Gettler for the girls. I was informed that as a result of these tests the company's experts concluded that the girls were not radioactive, although Gettler told me that his readings in one case strongly suggested the presence of penetrative gamma rays. It is worth noting that, after the girls had been tested, one of the experts seated himself in the same chair in front of the instrument with 10 micrograms of radium element, or its equivalent, 5 micrograms in each of two vest pockets, and that the readings were no greater than those found in one of the girls. No test of the expiratory air, as outlined in our original article,[1] was made for the presence of emanation. We also had attempted to demonstrate radioactive deposits by means of penetrative gamma radiation in a manner similar to the test employed but had given this method up as entirely unsuitable for reasons that will be given in detail.

Shortly after this examination, at the suggestion of Von Sochocky, Mrs. Hughes prepared screens of pure phosphorescent zinc sulphide uncontaminated by radioactive substances. After these had been examined in the dark room for scintillations, with negative results, each girl blew her expired air over these screens beneath the miscroscope. Scintillation from the presence of alpha particles in the girls' expired air was easily demonstrated in all five cases, proving beyond a doubt that they had deposits of radioactive substances in their bodies, which were giving off emanation.

[1] Journal of American Medical Association, 85: 1769, Dec. 5, 1925.

### Author's Interpretation of the Disease

On the basis of the studies made by me and my associates, I am of the opinion that the anemias, jaw necroses, and various forms of crippling bone lesions encountered in these girls were due to the ingestion of insoluble sulphates of radium, mesothorium, and radiothorium which occurred when they were employed as dial painters and which were due to their habit of pointing the brushes in their mouths. Most of the paint swallowed passed through the gastrointestinal tract, but there was always a small amount that was absorbed day after day, month after month, and year after year, as they worked. This was eventually deposited as insoluble sulphates of colloidal or particulate size in the phagocytic cells of the sinusoids of the reticulo-endothelial system, and especially in the bones, liver, and spleen, with by far the greater amount in the bones.

In none of my patients that died, with the exception of the physicist, were there any appreciable radioactive deposits in the lungs. In this patient the type of exposure was different from that in the girls, consisting chiefly of the inhalation of emanation and radioactive dust and of penetrative external radiation. This observation is against the supposition of Castle and the Drinkers, who thought that the chief mode of entrance in these cases was by inhalation, and supports the original theory of Hoffman that the main danger lay in the licking of the brushes, with the consequent ingestion of the paint.

*General symptomatology.*—A sufficient time has now elapsed to permit the clinical recognition of two types of cases: The early fatal ones and those in which death has not occurred.

In the early fatal cases in which there have been at least 15 known deaths, all the patients suffered from a severe leukopenic anemia, and severe necroses of the mandible or maxillæ or both, with buccal lesions and often terminal sepsis. Symptoms were first noted in these cases in from one to seven years after the patients ceased working as dial painters.

The later group, in which the five living girls cited belong, and in which there is evidence that perhaps other girls are similarly affected, presents a somewhat different clinical picture. In these cases the necroses of the mandible and the maxillæ are not a prominent feature, nor is the severe anemia. It is quite possible that some of the patients may yet develop symptoms similar to those seen in the early cases, but in them the disease seems to follow a more chronic and slower course, characterized chiefly by low-grade crippling lesions of the bones due to a radiation osteitis set up by the deposits in the individual bones. With this classification in mind I shall discuss the special symptomatology of the disease more in detail.

### Special Symptomatology

*The anemias.*—The deposits in the bones, because of the great insolubility of the sulphates of radioactive substances, act as fixed deposits from which they continually emit irritative rays that constantly bombard, day after day, month after month, and year after year, the adjacent blood-forming centers, producing in time a severe and often fatal anemia.

The nature of the radiation is very important. Approximately 95 per cent of the rays coming from these bone deposits are alpha; the remaining 5 per cent consist of beta and gamma rays.

The alpha rays, which consist of the nuclei of helium atoms containing two positive charges (He + +), are ejected from the radioactive substances with great force, attaining an initial volicity on leaving the extranuclear electronic field ranging from one-twentieth to about one-twelfth that of light. They represent the fastest mass occupying objects yet known. Lind [2] says, "The alpha particle is the most potent agent yet known to science and in all probability will remain so, as it is hardly conceivable that any means will ever be devised of imparting to ponderable matter a velocity exceeding that at which the alpha particle is expelled from the atomic nucleus." It has great disruptive powers. It decomposes water into hydrogen, oxygen, and hydrogen dioxide, and hydrochloric acid into chlorine and hydrogen. These chemical changes are due to the terrific impact of the alpha particle and the atom, as it usually passes through or near the electron system surrounding the nucleus and jerks off one electron. The chemical reaction resulting from this ionization is of the ordinary molecular character. On rare occasions the nucleus of lighter atoms may be squarely struck by the alpha particle, with consequent atomic disruption and the ejection of a high velocity hydrogen atom (H rays).

Biologically the alpha rays are much more destructive to human tissues than either the beta or the gamma rays, the relation being 10,000 to 100 to 1, respectively. Therefore, radioactive elements in such small amounts that beta gamma radiations are almost negligible still produce, through their alpha radiations, intense physiologic effects, if given by mouth or by vein.

In no other previous record of body injury due to radiation has the alpha ray played such a conspicuous part as in these cases, since it ordinarily is easily screened by the radium container or the skin in all forms of external radiation. This is the first time in the history of radiation that the alpha ray has been allowed to play continually on such vital centers as the blood-forming organs. Alpha rays are easily screened and filtered out by even a thickness of paper. In the body they are almost completely absorbed by 1 mm. (one twenty-fifth inch) of body tissues. Because of the proximity of the blood-forming centers to the bones and bone sinusoids of the reticulo-endothelial system, the distance is not too great to prevent the disastrous effects of alpha radiation on these centers. Furthermore, as the charge of the alpha particle is positive and the colloid systems of the erythrocytes are strongly electronegative [28] and are permeable only by an anion, the red cells are particularly liable to injury.

In the early fatal cases, the morphology of the blood toward the end was that of a profound leukopenic anemia suggestive of the regenerative type. The color index was often one plus, and a large cell anisocytosis with many macrocytes was not infrequent. Occasionally a megaloblast was found. The leukocytes were always diminished in number, a definite leukopenia existing, the lymphocyte being the

[2] Lind, S. C.: The Chemical Effects of Alpha Particles and Electrons, ed. 2, New York, Chemical Catalog Co. (Inc.), 1928, pp. 63–68.
[28] Evans, Archibald: Personal communication to the author.

predominant cell. In some cases the polymorphonuclears were practically absent from the peripheral blood. In only one of five fatal cases was there a hemorrhagic diathesis, and in this case the megakaryocytes were undoubtedly affected as the blood platelets were markedly decreased. Petechias which sometimes occurred in the terminal stages were due chiefly to the superadded sepsis. In spite of the resemblance of these early cases to pernicious anemia, there was little or no evidence of the so-called increased hemolysis. The icterus index was normal or low, and the Van den Bergh tests were negative. In the cases in which autopsies were performed there was no pronounced increase in hemosiderin deposits in the liver, spleen, and kidneys, such as is seen in addisonian anemia.

As anatomic evidence that the anemias in these early fatal cases were not of the aplastic or aregenerative type a dark red marrow was found throughout the femurs in five cases. I specify the marrow of the femur, as I believe that this is one of the few locations in which the accurate interpretation of the type of marrow is reliable.

Microscopic examination of paraffin sections from the red marrow of these early cases showed a regeneration of the magaloblastic type. The predominating cell was interpreted as belonging to the erythroblastic series, very numerous normoblasts and megaloblasts being present, many containing little or no hemoglobin. The fatty tissue of the marrow was almost entirely replaced by this hyperplastic marrow. Megakaryocytes were very abundant in most cases. Eosinophils and eosinophilic myelocytes were very numerous.

The occurrence of this apparently hyperplastic marrow was puzzling, since, heretofore, in the report of anemias due to undue exposure to X ray and gamma radiation from radioactive substances, they have been usually described as distinctly aplastic in type. As in practically none of these cases was necropsy performed or study of the bone marrow made, this conception is purely a clinical one and may not always be substantiated by the facts as we know them.

I had the opportunity of studying the bone marrow sections in these cases with Drs. Edward Krumbhaar and Douglas Symmers. We agreed that there were many cells which could not be identified with certainty. It was impossible to say whether these cells were of erythroblastic or myeloblastic origin, or whether they arose from the undifferentiated metrocyte. Oxydase stains in such a dilemma usually are of little value. The fact that the marrow was intensely red would seem to be against the predominating cell being myeloblastic in origin. Unfortunately, smears from the marrow were not taken, which method is perhaps better than paraffin sections for accurate identification. The question of a myeloblastic marrow which may appear red to the naked eye can not be lightly dismissed, when it is recalled that cases of undue exposure to radiation in which a hyperproduction instead of a leukopenia occurs have been reported. This has been of sufficient degree to produce a leukemia in several instances. The difficulty in the proper interpretation of bone marrow is well recognized and the development of new chemical stains and the study of the marrow during life in various stages of anemias is greatly needed. In one of Flinn's [22] patients, a dial painter who worked in a Connecticut plant and died in New York, the condition of the

[22] Flinn, F. B.: A Case of Antral Sinusitis Complicated by Radium Poisoning, Laryngoscope 37: 341-349, May, 1927.

marrow presented the same general appearance as is seen in chronic benzene poisoning. Pappenheimer,[29] who performed the autopsy in this case, told me that the marrow was aplastic.

In the case of Von Sochocky, numerous blood examinations made during his last illness never showed the slightest attempt at regeneration, even after the administration of a liver diet. The anemia was definitely aplastic throughout its course, the red cells never showing the anisocytosis and macrocytosis seen in the earlier cases. The latter cases, therefore, appear to resemble more closely those previously described in the literature.

In the excellent review by De Laet [27] on the deleterious effects from the professional handling of radioactive substances and X rays, he cites the following cases:

Aubertin and Bordet (1909) examined the blood of radiologists and animals after irradiation and found persistent leukopenias often followed by a slight polynucleosis with an eosinophilia.

Vaquez relates the case of a radiographer who died in 1911 of myeloid leukemia.

Mottram (1920) states that a single exposure to gamma rays of radium may produce injury to the blood-forming organs. Persistent exposures may lead to an aplastic anemia and in rare instances to a myelogenous or even lymphatic leukemia.

Mottram and Clark (1920) found in irradiated animals leukopenias alternating with periods showing a leukocytosis.

Mottram (1920) reports three deaths among the personnel of the London Radium Institute from exposure to radium alone. All three patients had leukopenic anemias. No postmortem examinations were made.

Ross (1921) thinks that the gamma rays from radium are more penetrating and cause more injury to the blood-forming organs, particularly the leukoblastic centers, than do the X rays.

Caffaratti (1923), in examining the blood of 50 radiologists, found leukopenias which often occurred early and were persistent. Most of the subjects recovered when they withdrew from exposure.

Williams (1923), in a study of the personnel measuring radioactive substances in the United States Bureau of Standards, found leukopenias and mild anemias.

Amundsen (1924) found leukopenias in 15 subjects coming in contact with radioactive substances.

Rud (1924) found leukopenias in 6 physicians, 6 nurses, 2 technicians and 3 assistants attached to an X-ray department, due to exposure to X rays and radium.

Faber (1924) relates the case of the radiologist Nordenhoff, who died in 1922 from an aplastic anemia.

Carman (1924) reports the case of Doctor Mills, a radiographer, who had an acute appendicitis and lymphatic leukemia.

Weil and Lacassagne (1925) report the death of two workers who were engaged in the separation of thorium X from mesothorium in the same laboratory. One died of an aplastic anemia and the other from myelogenous leukemia.

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[27] De Laet, Maurice: La pathologie professionnelle due aux corps radioactifs, Ann. de méd. légale, October, 1928, pp. 442–452.

[29] Pappenheimer, A. M.: Personal communication to the author.

Weil (1926) described a case of myelogenous leukemia following several injections of thorium X.

Jagie, Liebenrock, and Scharz, cited by Jaulin (1927), observed four persons exposed to X rays and radioactive substances who died from lymphatic leukemia.

Jaulin (1927) reviews 17 deaths of subjects coming into contact with radiations.

Brule and Boulin [30] (1925) state that only a few cases of pernicious anemia due to radium can be found in the literature, but this severe disease is without doubt more frequent that published reports indicate.

Carman [31] states that Dominici succumbed to an aplastic anemia due to the habit of carrying packages of radium in his pockets, and that Tiraboschi, an Italian Röntgenologist, died of an essential anemia due to exposure to X rays.

It is worthy of note in a review of the literature that, with the exception of two cases reported by Weil and Lacassagne and one by Reitter and Martland, no autopsies were performed in any of the cases. To allow the opportunity of collecting accurate data for the future protection of workers in radioactivity to be wasted is quite incomprehensible.

The opinions of different authorities all agree that contact with radioactive substances and X rays frequently produces, aside from lesions in the external organs such as the skin, deep and often profound alterations, of which the principal objective symptoms are usually a leukopenia, more rarely a leukemia, an anemia usually of the aplastic type but sometimes with malformations of the red cells suggesting an anemia of the pernicious or regenerative type, a fall in systolic blood pressure and sterility. These alterations may occur very early after the first contact and be mild in character and curable, or, when once established after undue exposure, they may persist even after cessation of the exposure.

Even with the most modern methods of protection, such as proper screens, frequent shifting in work, vacations, and proper ventilation, all workers with X rays and radioactive substances are exposed to the deleterious effects of radiation and are potential candidates at any time for the development of a serious and fatal anemia or leukemia. In these anemias, if the leukoblastic centers for the formation of the granulocytes bear the brunt of the injury, sepsis, bone necrosis, endocarditis or septic bronchopneumonia are apt to supervene. If the megakaryocyte is destroyed, the diminution in blood platelets causes the hemorrhagic diathesis to predominate, and hemorrhages from the mucous membranes, bowel, lungs, and kidneys occur. If the main injury is to the erythrobalistic centers, the symptoms of a profound anemia of the aplastic and sometimes of the pernicious types result. Combinations of all occur.

I am at a loss to explain the exact modus operandi of the anemias in these cases. They differ in some respects from those already recorded in the literature, and this is probably due to the fact that the alpha particle is the important etiologic factor. Why was a red, regenerating marrow present in these early cases? A discussion of

[30] Brule, M., and Boulin, R.: Un cas d'anémia aplastique provoquée par le radium. Bull. et mém. Soc. méd. d. hôp. de Paris 49: 528, Mar. 27, 1925.

[31] Carman, R. D., and Miller, A.: Occupational Hazards of Radiologist. Radiology 3: 408–419, November, 1924.

this question demands consideration of recent advances in the study of pernicious anemia.

Although Cohenheim in 1876 considered pernicious anemia as due primarily to a disturbance in blood formation, most writers have looked on the disease as a hemolytic anemia. Their arguments were based on the evidence of increased blood destruction, such as an increased icterus index, positive indirect Van den Bergh tests, increased bilirubin derivatives, and the presence of increased hemosiderin deposits in the spleen, liver, and kidneys. The hyperplastic red marrow found at autopsy was considered an attempt to overcome this increased destruction. This view was considered by most observers in the last 10 years as settled and indisputable.

The collossal advance made in the last four years in the understanding of the nature of this disease has been due almost entirely to the work of American investigators. Outstanding research of which American medicine should be proud has been accomplished by McCollum [32] on the close resemblance of sprue, pellagra, and pernicious anemia and the beneficial effects of liver soup in sprue; by Whipple and Robscheit-Robbins [33] on blood regeneration in severe anemias and the favorable influence of liver, heart, and skeletal muscle in the diet; by Minot and Murphy [34] on the treatment of pernicious anemia by a liver diet; by Minot, Cohn, and others [35] on the treatment of the disease by liver fractions; by Peabody [36] on the histologic study of the bone marrow in different stages of the disease by using the method of bone marrow puncture devised by Ghedini and elaborating on the observations already made by Zadek, showing that during the remissions the marrow returns to its normal state; and by Castle and Locke [37] on the importance of achylia gastrica as preventing the formation of the specific substance which is needed to cause maturation of the erythroblastic centers. Nobel prizes have been awarded for work of less importance.

Haden [38] says:

> We must look on pernicious anemia as due primarily to an inability of the bone marrow to mature red cells resulting from the lack of some specific substance and thus classify it among the deficiency diseases. Tissues other than the liver, such as the kidney, can furnish the specific substance, so the deficiency is not necessarily a hepatic one. It is more likely due to a failure of absorption, or an elaboration in the intestinal tract of the specific maturating substance, perhaps resulting from a long existent achlorhydria.

The increased amounts of bilirubin in the blood, tissues, and secretions represents not evidence of increased hemolysis but an excess of pigment over what the marrow can use in active stages of the disease.

In the study of the obscure anemias the appearance of the marrow at autopsy can no longer be taken as conclusive. The marrow is undoubtedly subject to all sorts of terminal revolutions. I have just

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[32] McCollum, E. V.: The Newer Knowledge of Nutrition, ed. 2, New York. McMillan Co., 1922.
[33] Robscheit-Robbins, F. S., and Whipple, G. H.: Blood Regeneration in Severe Anemia. Am. J. Physiol., 72: 408, May, 1925.
[34] Minot, G. R., and Murphy, W. P.: Treatment of Pernicious Anemia by a Special Diet. J. A. M. A. 87: 471, Aug. 14, 1926.
[35] Minot, G. R., Cohn, E. J., Murphy, W. P., and Lawson, H. A.: Treatment of Pernicious Anemia with Liver Extract. Am. J. M. Sc. 175: 599, May, 1928.
[36] Peabody, F. W.: Am. J. Path. 3: 179, May, 1927.
[37] Castle, W. B., and Locke, E. A.: Observations on the Etiologic Relationship of Achylia Gastrica to Pernicious Anemia, read before the Annual Meeting of the American Society for Clinical Investigation, Washington, D. C., Apr. 30, 1928.
[38] Haden, R. L.: The Essential Nature of Pernicious Anemia, editorial. J. Lab. & Clin. Med. 14: 189, November, 1928.

had the opportunity of observing at autopsy a red marrow of the regenerating type in a man who died from an aplastic anemia due to chronic benzene poisoning. He was a dope man in an artificial leather plant. Two other members of his family who worked in the same plant have died from chronic benzene poisoning. All three had aplastic anemias during life with marked leukopenias, thrombocytopenias and bleeding from the mucous membranes, gums, and intestinal tract. Yet from the previous recorded cases of benzene poisoning hardly anyone would believe me when I state that this man died from the poisonous effects of benzene.

Is the anemia in these cases of radium poisoning essentially an aplastic one due to destruction of the erythroblastic centers by continual bombardment of irritative rays, particularly alpha? Was there an heroic last attempt in the early cases to produce red cells, causing at autopsy a red marrow? Would these early cases, if death had not supervened, finally have become truly aplastic at autopsy as did Pappenheimer's case? All these ideas are purely speculative from our present knowledge.

*The jaw necroses.*—What, then, is the explanation of the extensive necroses in the mandible and often the maxilla seen in the early fatal cases, and absent, recovered from, or never a prominent symptom in the patients now alive?

In some of these cases this necrosis would precede the appearance of a severe anemia; in other cases it would develop after the anemia had existed for some time. There does not seem to be any connection between the two. In our early work,[1] in 1925, we were at a loss to explain the localization of this extensive necrosis in these bones. As the jaw necrosis was the outstanding feature of the early cases, our attention was fixed mainly on this symptom and little was paid to changes in the other bones of the skeleton, although an extensive coxa vara was noted in one case. The necrosis of the jaw was at that time thought to be due to local irritative radiation at the portal of entry, produced by clinging particles of radioactive substances on the gums, in the crevices and interstices between the teeth and the bone, activated by increased bacterial virulence of the organisms in the mouth caused by the irritative or stimulative effects of small amounts of radiation. These bones were thought to contain a greater amount of radioactivity than did other bones of the skeleton. It was not until I began to see the later cases that I realized that this was not the correct interpretation of the lesion. In the later cases, localized pain had occurred in other bones and destructive lesions were demonstrated by the Röntgenograms. These lesions were particularly noticeable in bones exposed to trauma, like the scaphoid in the feet (tight shoe), and those carrying considerable weight, such as the spine and the heads of the femurs. These lesions so far have never become infected. Autopsies had also shown that the jaw did not contain any more radioactivity than did other bones. In other words, the lesions were quite evenly distributed over the entire skeleton, although in each individual bone the distribution, while diffuse, was distinctly patchy and concentrated in areas. This distribution was demonstrated by photographic methods. Furthermore, histologic studies of bones, in which during life there had been localized

[1] Journal of American Medical Association, 85: 1769, Dec. 5, 1925.

pain and a Röntgenographic appearance unlike that seen in any other disease, showed that the marrow of these bones was replaced by a gelatinous, myxomatous, acellular loose fibroblastic tissue similar to that described by Ewing [39] in bones exposed to heavy external irradiation.

From these observations it was more logical to interpret the jaw necrosis as being primarily due to a radiation osteitis similar to that occurring in other bones. Owing to the proximity of the mouth, which is the dirtiest part of the body, and to the fact that the jaw bones have embedded in them the teeth, which act as foreign bodies, and because of the common occurrence of pyorrhea and root abscesses, the jaws are easily subjected to a superadded bacterial infection, in these cases in bones already the seat of a previous disease. The slightest dental intervention may start an intractable necrosis of these bones.

*The late cases.*—In the patients now living, the severe anemias and extensive jaw necroses which were the outstanding features of the early cases have not occurred up to the present time. The disease is now present in a milder form, undoubtedly as the result of the natural uninfluenceable decay of the mesothorium, which formed the largest percentage of the original deposits. There is a consequent diminution in the amount of irritative radiation. The main symptoms now are crippling bone lesions, the result of radiation osteitis. While it appears that many of these girls will escape a fatal outcome, one can not be too sure of this, as many show considerable radioactivity at the present time.

## Diagnosis During Life

I HAVE found that the easiest and most reliable method with which to detect the presence of radioactivity in the human body during life in this disease is by utilizing the expiratory air, for the demonstration of either the presence of emanation by means of an electrometer or the presence of the alpha particle by means of scintillation methods. As the total amount of radioactive substances deposited in the entire skeleton is small, ranging from 14 to 180 micrograms in the patients examined at autopsy, and because the human body can not be rolled up like a ball and placed opposite the electrometer, the detection of these small amounts of radioactivity by the gamma electrometer is not ordinarily possible. This is especially true when it is recalled that only a small amount of the radiation coming from these deposits is due to gamma rays, and that these rays must travel through a considerable amount of flesh before they leave the body, most of them being absorbed in this passage.

## Methods for Detection of Radioactivity

THE following, briefly described, are various methods available for the detection of radioactivity in the human body.

*Demonstration of emanation in expired air.*—Working with Conlon and Knef I first demonstrated the presence of emanation in the expired air of these patients on June 16, 1925. The only previous demonstration of emanation in the exhaled air of the human being

[39] Ewing, James: Radiation Osteitis, Acta Radial, 6: 399, 1926.

that I know of was made in 1915 by Seil, Viol, and Gordon [40] after the experimental ingestion of 50 micrograms of radium (element) by mouth. They said: "Radium taken into the body is continually disintegrating with the formation of the gaseous radioactive substance, radium emanation. This gas is carried by the blood to the lungs, where the emanation passes out of the blood by diffusion, and is lost from the body in breathing."

The demonstration of emanation in the expired air is not a difficult one but it should be performed by a physicist well versed in radium work. The subject passes the expired air by means of a rubber tube through a series of moisture absorption bottles containing calcium chloride and sulphuric acid into the ionization chamber of an electrometer for a period of five minutes, the stopcocks on the instrument then being closed. I usually have the subject blow the air through a cylinder containing glass wool or calcium chloride, then through two cylinders containing sulphuric acid, another containing glass wool, and then into the ionization chamber of either an alpha electroscope of the Lind type or, better, an electrometer of the Wulf type. The latter instrument has a silvered quartz thread, is of very small electrostatic capacity, and by the emanation methods can be read quantitatively to 0.001 microcurie.

Readings are then begun. The accompanying table gives the readings of a test made on one of the dial painters:

*Demonstration of emanation in expiratory air*

Normal leak during test:
- 8.5 subdivisions in 50 minutes.
- 33.5 subdivisions in first 10 minutes.
- 16.2 subdivisions in second 10 minutes.
- 15.7 subdivisions in third 10 minutes.
- 16.6 subdivisions in fourth 10 minutes.
- 17.7 subdivisions in fifth 10 minutes.

Leak during test: 99.7 subdivisions in 50 minutes.

In this case there was a much greater leakage during the first and second 10-minute periods than thereafter. This is due to the fact that the expired air contains a mixture of emanation originating from mesothorium with its decayed products and radium.

The chamber of the electrometer must then be deemanated. This is accomplished by passing air through it by means of a suction pump for a few hours. On account of small amounts of active deposit, the chamber becomes actually contaminated and should not be used for another test until about four days later.

The objection to this test for the examination of a considerable number of workmen is obvious, since it is cumbersome and time consuming.

*Determination of radioactivity by means of gamma electroscope.*—June 16, 1925, Von Sochocky, Conlon, and I used a gamma electrometer of the Wulf type to demonstrate penetrative gamma rays coming from the body of one of the girls. This is the first time as far as we know that this test was made on a human being. The instrument was placed 18 inches from the chest of the patient and 9 inches

[40] Seil, H. A.; Viol, C. H., and Gordon, M. A.: The Elimination of Soluble Radium Salts Taken Intravenously and per Os. Radium, 5:42, May, 1915.

above the level of the bed. Readings showed a normal leak before the test, 10 subdivisions an hour, and a total leak during the test of 14 subdivisions an hour. The difference of four subdivisions an hour was probably caused by penetrative radiations coming from the body of the patient. The girl died a few days later. The increased leakage, however, was small, and was merely a suggestion of the presence of radioactive substances in the body. After autopsy in this case it was estimated that the skeleton contained 180 micrograms of radioactive substances, about 70 per cent being from mesothorium and its decay products.

On account of the superiority of the method of examining the expired air for the presence of emanation, we discontinued using the method just described. In May, 1927, Flinn [22] resurrected it and stated that in one of his cases a gamma electroscope, when placed close to the body, showed gamma radiation which was estimated at about 100 micrograms in the entire body. After the administration of ammonium chloride for four days, this was reduced to 86 micrograms.

My attention was again called to this method when in May, 1928, I had the opportunity of seeing this test employed by Schlundt and Flinn in examining the five girls.

My opinion is that this test will not demonstrate the presence of radioactivity in most cases and that to conclude that the subject is not radioactive on the basis of negative observations of this character might do a great injustice. My reasons are as follows:

First, the amounts of radioactive substances found in these cases must be taken into account. In the fatal cases the first quantitative examination of the organs ever made on a human being was in the case reported by Reitter and me [19] in which Barker, the company's physicist, found 14 micrograms of radioactive element in the skeleton. In the next case I found 180 micrograms and soon after, in another case, 150 gm. in the entire skeleton. In a body exhumed five years after death, Gettler found 48.282 micrograms in the entire skeleton. It will be seen, therefore, from the cases examined at autopsy that the so-called lethal dose, if such a dose exists, seems to range from 10 to 180 micrograms of radioactive substances (estimated as radium element) deposited in the bones. If it is now recalled that 95 per cent of the rays coming, for example, from 14 micrograms distributed over the entire skeleton are alpha rays, and that these are almost entirely absorbed by 1 millimeter of body tissue, it stands to reason that none of these alpha rays will be present on the surface of the body. Then if it is assumed that the remaining 5 per cent are beta and gamma, the amount of penetrative radiation from 14 micrograms would be extremely small. Beta rays are absorbed by 1 centimeter of body tissue, and 75 per cent of gamma rays will not pass through more than 10 centimeters of tissue. It will be seen, therefore, that the amount of gamma rays leaving the surface of the body from such small amounts as 14 micrograms deposited in the bones will be so small as scarcely to affect a gamma electrometer, especially one in which the ionization chamber is constructed of brass and is from 2 to 3 millimeters thick. It is quite impossible to roll the human

[19] Reitter, G. S., and Martland, H. S.: Leucopenic Anemia of the Regenerative Type Due to Exposure to Radium and Mesothorium. Am. J. Röntgenol. 16: 161–167, August, 1926.

[22] Flinn, F. B.: A Case of Antral Sinusitis Complicated by Radium Poisoning. Laryngoscope 37: 341–349, May, 1927.

body up into a small mass and place it directly in front of the instrument. Using the same position occupied by the girls while being tested by this method, I estimated that the middle of the tibia was 3½ feet away from the instrument, the middle of the femur, 2½ feet, and the top of the head, 1½ feet. In addition, these girls when tested probably had a much smaller amount of radioactive substances in their skeletons than did those who died earlier, as they seem to be wearing down the disease as a result of the natural decay of the mesothorium.

*Demonstrations of radioactivity by photographic methods.*—Whether radioactivity could be demonstrated by photographic methods during life in these cases is questionable, as the deposits are not large enough and the films would have to remain in place too long a time. However in the earlier studies girls suffering from jaw necrosis held dental films in their mouths for several hours but photographic impressions were never obtained. Later it was found in photographic studies on material obtained at autopsy that such films had to lie against the bones for from five days to three weeks or more to show definite exposures. For these reasons it would seem that photography will never be of any value in the study of similar patients while they are alive.

## Diagnosis After Death

ASIDE from the severe anemias with the characteristics described, the jaw necroses, the radiation osteitis in other bones with its resulting crippling deformities, and the remaining pathologic changes depend chiefly on the mode of death, the occurrence of buccal lesions and sepsis.

The main interest aside from the pathologic changes, therefore, is directed to the demonstration of radioactivity in the organs, particularly the bones, its character, the amount present, and the location.

*Photographic methods.*—Photography is of the greatest usefulness in the demonstration of radioactivity in the bones of these patients, since the intensity of the photographs gives a quick, indisputable diagnosis of its presence, and often a rough estimate of the approximate amounts. Photographic methods are of the greatest importance scientifically, as they are the only means by which the exact anatomic location of the radioactive deposits in the bones or other organs can be determined. The pictures obtained are so definite that they leave little doubt. Of course, much depends on the speed of the plates or films used, the length of exposure, and the method of development. I have found by experience that, for the demonstration of radioactivity in the organs after death, the methods given here are the most practical.

After the bones have been cleaned they may be boiled in water with a little sodium bicarbonate if necessary; they are rinsed and then dried in a hot-air oven. They are now ready for demonstration of radioactivity by photographic methods.

First method: Standard dental films in their original packets are strapped with adhessive plaster over the bones in the positions desired, with the film surface directed against the bone. Metal paper clips or pieces of lead foil are interposed between the bone and the film surface of the packet. In this method the alpha rays, which form 95 per cent of the radiation in these cases, are screened by the paper of the

packet, so that any photographic impressions obtained must be due to penetrative beta and gamma rays. They should be left on the bones for from two to three weeks, or longer, before being developed. The shortest time in which I obtained photographs by this method was 17 days from the femur in one case and 18 days from the mandible. If radioactivity is present, the films when developed are fogged and the shadows of the metal clips show as unexposed areas, rather sharply defined, but not as sharp in outline as when obtained by means of the Röntgen ray on account of characteristic scattering of the beta rays. These pictures have been designated by me as shadowgrams. This method is a very safe one, since there is no necessity for exposing the original films until time for development. I have found from numerous control studies that nothing will produce photographic impression on these packets except radiation from radioactive substances or the Röntgen ray.

Second method: The bones should be very well cleaned and free from moisture or grease. They may be partly incinerated or the bone ash may be used after complete incineration. If the ash is used it is well to wait 30 days, as the incineration temporarily deemanates the bone.

In the dark room the bones are placed directly against and on the film surface of preferably an Eastman 5 by 7 superspeed or process film. I prefer the latter for contrast but it requires a longer exposure. In placing the bones in position the light must be a safe one, since a strong red light during the placing of the bone in position may cause a slight exposure which, on development, will show the outline of the bone when no radioactivity is present. This exposure, however, will be reversed in color and not easily confused with that due to radioactivity.

Because the preponderance of the rays from these deposits are alpha rays, photographic impressions will be obtained much more quickly than in the first method. I have obtained pictures in 3 days from the mandible, but usually from 7 to 10 days is required. If exposure is too long extensive fogging may take place, rendering the exact distribution of the deposits in the bones obscure. These pictures are characterized by irregular fogging of the plate or film, and often show definite alpha penciling. They show beautifully the distribution of the radioactive deposits in the bone, their irregularity and concentration, and the strong tendency to accumulate eventually in the outer portions of the compact bone.

By means of an ingenious technic used by Lacassagne [41] in his experimental work with polonium, I was able to obtain "autohistoradiographies" from paraffin blocks of the bones after histologic sections were cut. These demonstrated the uneven deposits of the radioactivity in the bone and a peculiar concentration in the femurs toward the outer part of the cortex. These pictures usually require from 15 to 20 days or more exposure for the obtaining of photographic impressions. They may be compared accurately with the histologic slide cut from the same block.

[41] Lacassagne, A.; Lattes, J., and Ladivan, J. L.: Etude expérimentale des effets biologiques du polonium introduit dans l'organisme, J. de radiol. & d'électrol. 9: 1, Jan., 1925.

I have made many normal control studies by these methods and have never obtained any photographic impression except from an accidental or careless leakage of light when radioactivity was absent.

It has been stated that photographic impressions may sometimes be obtained from coins and various other objects by placing them in contact with photographic plates or films for a long period of time. Besides the well-known radioactive families uranium, thorium, and actinium, the elements potassium and rubidium have been shown to possess the property of radioactivity. The last two elements have been shown to emit beta rays.[42]

The photographic impressions produced by these objects on plates or films are extremely faint at best and can not compare with the ease and sharpness of the pictures obtained in these cases. Furthermore, when dental films are used as in the first method, most of these technical difficulties are readily eliminated.

As regards the measuring of radioactivity by photographic methods it is only fair to express the view of Rutherford,[43] who says:

> As a general method of study of the radiations, it [photographic method] is open to many objections. A day's exposure is generally required to produce an appreciable darkening of the sensitive film when exposed to a weak source of radiation like uranium and thorium. It can not, in consequence, be employed to investigate the radiations of those active products which rapidly lose their activity. Moreover, it is shown that the darkening of a photographic plate can be produced by many agents which do not give out rays like those of the radioactive bodies. This darkening of the plate is produced under the most varied conditions and very special precautions are necessary when long exposures to a weak source of radiation are required. * * * The chief drawback of the photographic method lies in the difficulty of deducing the intensity of the radiation from measurements of the density of the photographic impression. In addition, the relative photographic effect of the different types of radiation is dependent on the thickness and rapidity of the films and plates employed. * * * In most cases, however, where thin films of radioactive matter are used, the photographic effect in a vacuum or close to the active film is mainly due to alpha rays.

*Demonstration of radioactivity by means of alpha electroscope.*—In the examination of the organs for radioactivity I usually proceeded in the following manner: The organs after removal at autopsy were chopped up by being passed through a food chopper and dried over a sand bath to a slight charring. They were then partly incinerated in the electric oven at low heat, most of the organic matter being driven off. Bones were sawed into small pieces and organic matter was burned off in the incinerator. The organs were then placed in bottles and sealed.

Separate specimens of the various organs to be tested which had been partly incinerated were then placed in a cardboard container and put in the lower compartment of an alpha electroscope of the Lind type. The various readings were then made, the normal leak always being taken before each test. The normal leak was usually considered the time it took the foil to go across the entire microscopic scale.

The following protocol illustrates one of these tests:

*Liver.*—Normal leak, 2 minutes and 20 seconds; test, 2 minutes.
*Spleen.*—Normal leak, 2 minutes and 21 seconds; test, 26 seconds.

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[42] Campbell, N. R., and Wood, A.: Proc. Cambridge Phil. Soc. 14: 15, 1907. Harkins, W. D., and Guy, W. G.: Proc. Nat. Acad. Sc. 11: 268, 1925.
[43] Rutherford, E.: Radioactive Substances and Their Radiations, Cambridge at the University Press, New York, G. P. Putnam's Sons, 1913, pp. 87–88.

*Bone cortex.*—Normal leak, 2 minutes and 18 seconds; test, 1 minute and 21 seconds.

*Bone marrow.*—Normal leak, 2 minutes and 18 seconds; test, 1 minute and 15 seconds.

From this protocol it is seen that the bones contain by far the most radioactivity, the spleen a definite amount, and the liver a trace. After the test was made all the material, including the inferior maxilla and the two femurs, was then placed near the gamma electrometer and the following readings were made:

Normal leak, 28 minutes; test, 22 minutes and 43 seconds.

*Quantitative estimation of the amounts of radioactive deposits by chemical extraction.*—The following procedure was used in most of our quantitative work: After radioactivity was demonstrated in the bones by these methods—positive photographic impressions, readings with the alpha electroscope, and positive penetrative gamma radiation with the gamma electrometer—the bones were incinerated in an electric oven to a white ash with an excess of carbon. A paste of this ash was then made with barium chloride and hydrochloric acid. This paste was then boiled with hydrochloric acid and distilled water and filtered while hot through a hard paper. The precipitate on the paper was allowed to dry and was incinerated with the paper. The ash was tubed and sealed and its radioactivity was measured by gamma penetration 30 days later. This ash contained the radiothorium. The filtrate was treated with sulphuric acid and allowed to stand for a precipitate. When this had formed, it was boiled and filtered while hot to hold the calcium sulphate in solution. The second precipitate on the filter paper was dried and incinerated and the ash tubed and measured 30 days later by the gamma electrometer for the amount of radium and mesothorium present. The final filtrate should not show any radioactivity if extraction has been complete. The tubes containing the incinerated precipitates were then measured after an interval of 30 days to permit them to return to equilibrium, the deposits having been deemanated by the incineration. The calculations were made by the gamma electrometer, the readings obtained being compared against known standards.

## Prognosis and Treatment

As THERE is no specific treatment so far devised for this type of poisoning, the prognosis and tentative treatment may be discussed together. In 1925 we [1] stated that there was no form of treatment which would be specific on account of the great insolubility of the radioactive deposits in the bones. To have a specific treatment means that one must first be able to convert the deposits into some form of soluble salts, which can then be eliminated. We do not see any reasons at present for changing our original opinion. Incineration of the bones into a white ash will not decrease the deposits but only temporarily deemanate the bones. To extract the substances from the bones, boiling the ash with hydrochloric acid is necessary to convert the insoluble sulphate into a chloride. How is it possible, therefore, to conceive of any form of treatment that will affect such deposits?

[1] Journal of American Medical Association, 85: 1769, Dec. 5, 1925.

Thinking that it might be possible to influence these deposits, Flinn[22] treated one of the Connecticut patients with large doses of ammonium chloride and reported that a diminution in the amounts in the skeleton could be detected by the gamma electroscope. This patient, however, died. Because of the amounts of the radium found by Gettler in his case, in the various organs, he thought that some must be in the circulation. Following the work of Aub, Minot, and their coworkers on lead poisoning, he tried to produce an acidosis, but apparently had little results.

According to similar lines of reasoning, the production of an alkalosis might also be tried and even the feeding of parathyroid and calcium.

Another vague possibility of counteracting the effects of these deposits is by a method which Evans[44] is about to describe. He has found that it is possible, by the use of colloids, to protect the body tissues from the deleterious effects of an overdosage of X rays, no matter how great the dose has been. This depends on the well-known laws of colloids and their electrical charge. He has suggested that this form of treatment might be tried. It would seem, however, that this procedure is mainly theoretical at the present time.

For the reasons stated the treatment resolves itself, at present, to a purely symptomatic one; in the early cases, the care of the mouth, the prevention of sepsis, the treatment of anemias by liver diet, sunlight, high altitude to produce a polycythemia, and quartz lights, and, in the later cases, by general hygienic treatment and any special orthopedic treatment that is deemed necessary.

The most helpful thought to be offered to those afflicted and now alive is that a sufficient time has elapsed to allow the mesothorium, which probably predominates in most of these cases, to have passed its half period time, and, in some cases, even its full life, so that, through its uninfluenceable decay, the skeleton is becoming free and the constant bombardment of the alpha rays is diminishing or about stopped. This would seem to be the most rational explanation of the difference in the clinical pictures in the early and the later cases. If most of the deposits are due to mesothorium and its derivatives, which the chemical extraction in four of my cases has shown to be true, in 6.7 years after injection these should be reduced to one-half strength, and if the patients could survive a period of 12 years, most of it would be eliminated as a result of its natural decay. While such patients might continue to suffer from chronic, crippling bone lesions, the result of radiation osteitis, they might escape the fatal outcome of the anemias and the jaw necroses with the added sepsis. If, however, radium predominates, such a dimunition of the deposits as a result of natural decay is out of the question, as the half period of radium is 1,750 years.

## Future Prophylaxis in the Watch Dial Industry

THE results of this investigation have shown conclusively that in the New Jersey cases the habit of pointing the brushes in the mouth was the main cause of disability. Of course, in the factory inspection of

[22] Flinn, F. B.: A Case of Antral Sinusitis Complicated by Radium Poisoning, Laryngoscope 37: 341-349, May, 1927.
[44] Evans, Archibald: Personal communication to the author.

the plant, the Drinker report shows that the walls and ceilings of the rooms in which these girls worked were so contaminated with radioactive substances that other methods of entrance into the body were also possible.

Recently the United States Public Health Service was asked to make a national survey of the watch industry for similar types of poisoning along lines akin to their investigation of the tetraethyl lead situation. Such an investigation would be of great importance, no doubt, and it is possible that similar disastrous effects may be revealed. The great trouble with most investigations is that they always start after the harm has been done.

It would seem that, following the extensive notoriety given these cases in the press, any manufacturer who would allow a continuation of the practice of licking brushes, or who would not take steps to prevent contamination in other ways, would be a simpleton. Yet, who can tell? It is stated that Mme. Curie in an interview given the New York Journal said that she was surprised that the United States Government would permit the handling of such dangerous substances as radium and mesothorium in such a careless manner, and that the continual swallowing of such substances was criminal.

## Criminality in the New Jersey Cases

WHEN I first ascertained in 1925 as medical examiner that deaths due to an occupational poisoning had occurred and were still happening, and when I could prove to my satisfaction the manner in which the poison entered the body, where it was deposited and its deleterious effects, the question arose as to criminality or responsibility.

In spite of the way in which this plant had treated its employees in continually refusing to admit that an occupational poisoning existed or to assume any responsibility, allowing any number of girls to spend their entire savings and in many instances the savings of their families and relatives in extensive dental and medical bills, I have always been of the opinion that the company did not intentionally intend to harm its employees. By the time I had uncovered the first cases, the habit of pointing the brushes in the mouth had been stopped. In fact, most of the dial painting had dwindled down, so that the company was chiefly concerned in the manufacture of the luminous paint and its sale to the watch industry.

There was therefore no reason to close the factory, and because I believed that there was no intentional criminality I never saw fit to report these cases to the prosecutor (district attorney) of the county in which they occurred. I did, however, send an official report to the State department of labor, feeling that these patients should properly be under compensation, and that the inspection of such plants was under their supervision. Attention was also called to the State compensation law and to the fact that such cases were not included under the present law.

The sad and unfortunate part of these cases is that the compensation law of New Jersey covering occupational diseases is so inelastic as to limit compensation to those diseases which are only specifically mentioned in the law.

At the present time, only the following 10 occupational diseases are compensable in New Jersey:

1. Anthrax.
2. Lead poisoning.
3. Mercury poisoning.
4. Arsenic poisoning.
5. Phosphorus poisoning.
6. Poisoning from benzene and its homologues, and all derivatives thereof.
7. Wood alcohol poisoning.
8. Chrome poisoning.
9. Caisson disease.
10. Mesothorium or radium necrosis.

The tenth disease, radium-mesothorium necrosis, was added in 1927, chiefly because of newspaper publicity over these cases. It is worthy of note that in the drawing up of the laws, the exact wording is usually coined by members of the legal profession based on information given them by some civic or lay body. It is unusual for them to consult those who are acquainted with the real facts. For this reason many of the laws are vague in meaning, often quite incomprehensible, full of loopholes, and in some cases containing jokers. To benefit under the compensation law in this State in regard to poisoning by the ingestion of radioactive substances, one must have radium-mesothorium necrosis. It can easily be seen from the description given here that many patients may die without ever having shown any jaw necrosis during life. Hence they are not covered by the present compensation law.

It was stated by Sir Thomas Oliver on his recent visit to this country that in northern New Jersey there was a larger number and variety of industries in which occupational poisoning could exist than in perhaps any other known geographic area in the world. In this location new industries are constantly appearing in which new chemical, physical and other hazards are becoming apparent. It is most important, therefore, that the compensation laws of the State should be so elastic as to include at any time new and hitherto undescribed forms of occupational poisoning. This should be comparatively simple. The State department of labor, for instance, could have at its disposal eminent consultants in occupational diseases, physicians, pathologists, chemists and physicists, who could be called on if a new disease appeared to give their unbiased opinion as to whether or not an occupational poisoning existed. If in their opinion it did exist, proper compensation should be given without the disgraceful wrangling of the hired medicolegal prostitutes and so-called experts that prey on the courts.

This, in my opinion, would perhaps be better than the so-called blanket compensation law that exists at present in five States. I am informed that such a law covering occupational diseases opens the road for political pull and graft, in which many common diseases, such as the ordinary garden variety of pulmonary tuberculosis, and malignant conditions are attributed to insignificant or slight injuries sustained while at work.

It is to be noted that while the compensation laws of New Jersey are being criticized, the same thing can be said, even more strongly, about other States. It is a well known fact that conditions in New

Jersey are far superior to those in some other States. In some States there are no compensation laws covering occupational diseases.

It is only fair to the employees and the employer that such compensation laws should be formulated. In the cases cited here it is an unfortunate and sad situation that more than 15 deaths occurred, in only 2 of which did the families receive any financial aid; and that some 50 girls have spent almost their entire earnings for years on dental bills and sickness. It is unfortunate that because of the lack of protection by compensation, the plant had continually to ignore responsibility and to fight every step in the courts to prevent financial ruin. This is not a fair deal for either side.

All these cases should properly have come under the compensation law. This would have saved the company an enormous amount of worry, loss of business due to publicity, and the possibility of impending financial ruin. If this disease had been properly covered by law, the victims would have been saved from the ignominy of becoming objects of charity. A competent body of medical authorities after the evidence was submitted could have disposed of the case in a day's time without the utter ridiculousness of dragging a simple case along for years in the courts. The only advantage out of this terrible mess has been, as usual, to the legal profession.

# RECENT ECONOMIC CHANGES

## Report of Committee on Recent Economic Changes

THE report of the committee on recent economic changes made public in May, constitutes a comprehensive survey of economic tendencies in the United States. This undertaking was an outgrowth of the President's Unemployment Conference of 1921. The committee appointed to deal with the subject of economic changes consists of Herbert Hoover, chairman; Walter F. Brown, Renick W. Dunlap, William Green, Julius Klein, John S. Lawrence, Max Mason, George McFadden, Adolph C. Miller, Lewis E. Pierson, John J. Raskob, A. W. Shaw, Louis J. Taber, Daniel Willard, Clarence M. Woolley, Owen D. Young, and Edward Eyre Hunt, secretary.

The report of the committee has been published by the Department of Commerce.[1] The detailed reports of the underlying investigations of particular topics are published under the title of "Recent Economic Changes."[2]

The text of the committee's report is given below.

### Section I.—Characteristics of the Years 1922–1929

ACCELERATION rather than structural change is the key to an understanding of our recent economic developments. Gradually the fact emerged during the course of this survey that the distinctive character of the years from 1922 to 1929 owes less to fundamental change than to intensified activity.

Forty years ago David A. Wells wrote his "Recent Economic Changes," showing that the quarter century which ended in 1889 was a period of "profound economic changes," which he described as "unquestionably more important and varied than during any former corresponding period of the world's history."

Each generation believes itself to be on the verge of a new economic era, an era of fundamental change, but the longer the committee deliberated, the more evident it became that the novelty of the period covered by the present survey rested chiefly in the fact that developments such as formerly affected our old industries have been recurring in our new industries. The changes have not been in structure but in speed and spread.

Invention is not a new art. Transportation and communication are not new services. The facilitating function of finance is older than coined currency. Agriculture is as ancient as history. Competition is not a new phenomenon. None of the changes in distribution on which emphasis has been laid in the last few years is basically new. Hand-to-mouth buying is old; sudden changes in style and demand are familiar; there is no new principle in installment selling; cooperative marketing is no modern discovery; the chain store movement dates back at least 25 years. But the breadth and scale and "tempo" of recent developments give them new importance.

[1] United States. Department of Commerce. Recent Economic Changes in the United States: Report of the Committee on Recent Economic Changes of the President's Conference on Unemployment. Washington, 1929. 32 pp.

[2] Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York. (2 vols.)

The increased supply of power and its wider uses; the multiplication by man of his strength and skill through machinery, the expert division and arrangement of work in mines and factories, on the farms and in the trades, so that production per man-hour of effort has risen to new heights; the quickening of these instrumentalities through capital provided from the surplus incomes of a constantly widening proportion of our people—all these represent an accumulation of forces which have long been at work.

The committee, like other observers, was early impressed by the degree of economic activity in these seven years. It was struck by the outpouring of energy which piled up skyscrapers in scores of cities; knit the 48 States together with 20,000 miles of airways; moved each year over railways and waterways more than a billion and a half tons of freight; thronged the highways with 25,000,000 motor cars; carried electricity to 17,000,000 homes; sent each year 3,750,000 children to high school and more than 1,000,000 young men and women to college; and fed, clothed, housed, and amused the 120,000,000 persons who occupy our twentieth of the habitable area of the earth.

But while the period from 1922 to 1929 has been one of intense activity, the committee noted that this activity has been "spotty." Certain groups have been more active than other groups; certain industries busier than their neighbor industries, and certain geographical areas more prosperous than other areas.

While rayon manufacturers have worked at top speed, cotton mills have been on part time; while the silk hosiery industry, the women's shoe trade, and the fur business have been active, there has been depression in the woolen and worsted industry; while dairying has been prosperous, grain growers have been depressed. Coal mining has been in difficulties, and classes of wholesalers and retailers have been under grave economic pressure. Progress has been made toward more stable employment in seasonal industries, yet "technological" unemployment, resulting from the displacement of workers by improved machinery and methods, has attracted attention.

Geographical differences also were noted. The Pacific States have made an extraordinary advance; the South has rapidly developed as a manufacturing area; the East North-Central division has grown; while the New England States and to some extent the Middle Atlantic section, have developed less rapidly and have experienced some difficulties in adapting their older industries to new conditions.

However, in spite of this variability, this difference in activity as between groups and areas and industries, the rising standard of living characteristic of this period was widespread and has reached the highest level in our national history.

Participation by the people as a whole in many of the benefits of increased productivity, which of itself varied as between different groups and geographical areas, has been one of the marked characteristics of the period. While industrial, agricultural, and commercial activity has been "spotty," the broad social advantages of our accelerated activity flowed out over the land. For example, the highway building programs throughout the nation were not limited to the intensely active areas; good roads were extended in all directions, serving the whole population. The same might be said for educa-

tional advantages, radio entertainment, personal mobility made possible by low-priced motor cars, swift and dependable transportation and communication, and numerous other facilities and services making for comfort and well-being, beyond the elemental requirements of food, clothing, and shelter.

This spread of higher living standards has been characteristic of our national life practically throughout our history. As a phenomenon it is not new, but in its degree and scope it has taken on a new importance.

### The Speed Which Power has Added to Production

Characteristic, also, has been the rise in the use of power—three and three-quarters times faster than the growth in population—and the extent to which power has been made readily available not alone for driving tools of increasing size and capacity, but for a convenient diversity of purposes in the smallest business enterprise and on the farm and in the home.

Factories no longer need cluster about the sources of power. Widespread interconnection between power plants, arising out of an increasing appreciation of the value of flexibility in power, and made possible by technical advances during recent years, has created huge reservoirs of power so that abnormal conditions in one locality need not stop the wheels of industry.

The increasing flexibility with which electricity can be delivered for power has enabled manufacturers and farmers to meet high labor costs by the application of power-driven specialized machines; and power in this flexible form has penetrated into every section of the United States, including many rural areas. The survey shows that as a Nation we now use as much electrical energy as all the rest of the world combined.

Through the subdivision of power the unskilled worker has become a skilled operator, multiplying his effectiveness with specialized automatic machinery and processes. Thus the unit cost of production has been reduced, the drudgery eliminated from much unskilled work, and wages maintained or actually increased.

### The Spread in the Source and Use of Credit

This acceleration of forces and its resultant rising standard of living have been facilitated by a continuing supply of funds.

In the breadth of the sources from which capital and credit have been available and in the quickening method of their use, may be observed again the changes in speed and spread of our recent economic activity.

In former periods the savings funds of the American people were not alone adequate for our capital requirements. In periods of business expansion the demand for funds pressed heavily upon the supply.

The reverse has been found to be true in the period under review. For the larger part of this period not only the earnings and savings of the people supplied the additional capital for financing the rapid development of industry, but in addition they furnished several billions of dollars for loans to foreign countries.

Stimulated by the urge for funds to finance the vast production program of the United States during the World War, the number of shareholders in the country's business enterprises has, it is estimated, grown from about 2,000,000 to more than 17,000,000; and out of increasing incomes these investors have continued to pour their savings into the stream of credit.

During the later months of the period covered by the survey a new tendency has been observed. Investors, as well as a large body of speculators, have invested through the stock exchanges not only their savings, but the proceeds of loans secured through banks and brokers, until the credit structure of the country has been sufficiently weighted to indicate a credit stringency, resulting in an abnormally high rate for call money and an appreciable increase in the rate of interest for business purposes. The consequences of this process can not be measured at this time, but they are factors in the problem of maintaining economic balance which will be touched on later in this report.

Meanwhile industry has been able to reduce its requirements for short-term credits from the banks through issuance of securities. The preference for permanent methods of financing business is reflected in the relatively small increase in commercial loans of banks in recent years, as contrasted with the increase in security holdings and collateral loans.

Imports of gold early in the period covered by the survey which tended to make credit easier; the growth of savings in spite of increased spending; the popular confidence in the financial structure, especially in the Federal reserve system, and the power of the system to move available credit to the places where it is needed, mark a great advance during these seven years.

There has also been an increase in the velocity of the turnover of credit, due to improved transportation and communication, scientific control of inventories, the continuation of the simplification movement, and our accelerated turnover of commodities. Business has thus developed a new degree of economy in the use of credit, which may be set down as another characteristic of the period.

## Section II.—Price Relationships, Wages, and the Cost of Living

THE PERIOD UNDER REVIEW is perhaps too brief for a definite judgment, and we are as yet too close in point of time to get an accurate perspective, but the committee feels that in the field of price relationships, wages, and the cost of living is to be found one of the striking and significant developments revealed by the survey, and one which more than any other gives these years their distinctive character.

Contrasting two periods of our comparatively recent economic history will perhaps serve to make clear the significance of these factors.

According to the best available statistics, in the period between 1896 and 1913, the wholesale price level rose on the average 2.3 per cent a year, but wages rose only a little more, so that their purchasing power advanced only 0.5 per cent a year. In the period from 1922 to 1927, prices declined on the average 0.1 per cent a year, while the purchasing power of wages rose 2.1 per cent a year.

In this latter period the fortunate synchronizing of a high wage level and a stationary cost of living created a phenomenon, new in degree, which had widespread influence on the economic situation, and which will bear close study in its details.

### Relative Price Stability

The increasing tendency toward price stability, both as between classes of commodities and in the price experience of individual commodities, was a characteristic of the period under review, tending toward a more equitable basis of exchange of products among the various groups. Price fluctuations seem to have been held within narrow limits during this period by a combination of factors: A more complete background of statistical information making possible better judgment regarding supply and demand on the part both of producers and consumers, prudence on the part of management, cost reductions by technicians, skill on the part of bankers, an enlightened attitude on the part of labor, and the expansion of foreign markets.

Relative price stability has involved a change in the direction in which business men look for profits. Profits made from the fluctuations of individual commodity prices, and from changes in the relation among prices, have tended to diminish.

Whether the price relationships of recent years prove to be transitory or permanent they represent to-day a huge gain which is reflected in all parts of the economic organism. It is a development too new to permit of dogmatic interpretation but the committee believes that this decreasing variability in prices at a time when the productivity per hour of labor has been greatly increased, and the demand for goods has been greatly stimulated, is one of the most significant factors disclosed by the survey.

The widening gap between wages and the cost of living—wages increasing while the cost of living was stationary—may be assumed to have contributed definitely to the degree of prosperity which has characterized the period as a whole. With rising wages and relatively stable prices we have become consumers of what we produce to an extent never before realized.

The factors in this situation appear in part to be accidental and in part the consequences of an advanced economic point of view.

In the early postwar period much of the press and many employers demanded a "liquidation" of labor. It was freely declared that business could not settle down until wages were brought back to pre-war levels. Labor had enjoyed a higher standard of living and naturally opposed wage cuts.

This might have precipitated a period of serious strife had it not been that leaders of industrial thought, watching the trend of affairs, noted that the result of the continuance of high wages was that the dammed-up purchasing desires which had been held back during the war on account of the national economic program, burst forth, and not only the high wages which were being currently earned but accumulated savings as well were poured into the channels of commerce.

They were quick to grasp the significance of the power of the consumer with money to spend to create an accelerated cycle of productivity.

They began consciously to propound the principle of high wages and low costs as a policy of enlightened industrial practice. This principle has since attracted the attention of economists all over the world, and while it is in no sense new, its application on a broad scale is so novel as to impress the committee as being a fundamental development.

### Production Increase and the Expansion of Human Wants

Partly as a result of this newly sensed principle of an accelerated cycle of production-consumption, and partly by reason of the development of a stream of credit and an abundance of flexible power made broadly available the years 1922 to 1929 witnessed a marked increase in the physical volume of production. Some years stand out more conspicuously than others; two—1924 and 1927—show minor recessions; but the period as a whole has been notably consistent.

Since 1922 primary production has been increasing 2.5 per cent a year; manufacturing, 4 per cent; transportation, 4 per cent. Taking 1919—a year of fair harvests—as a base, crop production in 1922 was 102; in 1925, 104; in 1927, 106.

There have been prosperous periods in the past which may have surpassed these rates of increase, but none so far as the committee can learn which has shown such a striking increase in productivity per man-hour. Notwithstanding the reductions in hours of labor, per capita productivity is nearly 60 per cent greater than it was toward the close of the nineteenth century; the increase in per capita productivity in manufacturing from 1922 to 1925 was 35 per cent; the productivity of farm workers has increased at a rate probably never before equaled.

And these increases in productivity have been joined to a corresponding increase in the consuming power of the American people. Here has been demonstrated on a grand scale the expansibility of human wants and desires.

Economists have long declared that consumption, the satisfaction of wants, would expand with little evidence of satiation if we could so adjust our economic processes as to make dormant demands effective. Such an expansion has been going on since the beginning of the industrial revolution. It is not a phenomenon of the postwar period, except in degree. But it is this degree of economic activity, this almost insatiable appetite for goods and services, this abounding production of all things which almost any man can want, which is so striking a characteristic of the period covered by the survey.

### Optional Consumption

The committee finds, from study of the fact-finding survey on which this report is based, that as a people we have become steadily less concerned about the primary needs—food, clothing, and shelter. We have long since lost all fear concerning our food supply, and so we no longer look on food as a luxury or as a primary source of pleasure. American food standards have risen, but we hear little of the "high cost of living," and the slogan of the "full dinner pail" is obsolete. We wear less clothing; more rayon and silks, less cotton and wool. Our wants have ranged more widely and we now demand a broad list of goods and services which come under the category of "optional purchases."

The rapidly increasing number of families in the United States having a considerable margin of earnings available for "optional consumption"—optional in the sense that this portion of the income may be saved or spent, and if spent the manner of its spending may be determined by the tastes of the consumer or the nature of the appeals made to him by the industries competing for his patronage—presents one of the marked characteristics of the recent economic situation. It is the personal or individual expression of the gap between rising wages and the relatively stable cost of living, referred to at the beginning of this section.

### Consumption and Leisure

Closely related to the increased rate of production-consumption of products is the consumption of leisure.

It was during the period covered by the survey that the conception of leisure as "consumable" began to be realized upon in business in a practical way and on a broad scale. It began to be recognized, not only that leisure is "consumable," but that people can not "consume" leisure without consuming goods and services, and that leisure which results from an increasing man-hour productivity helps to create new needs and new and broader markets.

The increasing interest in the fine arts and in science; the increased sales of books and magazines; the increase in foreign travel; the growing interest and participation in sports of all kinds; the domestic pilgrimages of some 40,000,000 motor tourists who use more than 2,000 tourist camps; the greatly increased enrollment in our high schools and colleges; the motion picture theaters and the radio—all these reflect the uses of increasing leisure.

During the period covered by the survey the trend toward increased leisure received a considerable impetus. The work week was shortened in the factory by better planning and modern machinery, and the workday was shortened in the home by the increased use of time-and-labor-saving appliances and services.

Few of the current economic developments have made such widespread changes in our national life or promise so much for the future as the utilization of our increasing leisure.

### "Mass Services"

The service functions are not new, but few of the developments revealed by the survey are of greater potential significance than the accelerated growth of our service industries—travel, entertainment, education, insurance, communication; the facilities of hotels, restaurants, delicatessen stores, steam laundries, and public libraries, to mention but a few.

An evolution which has been going on for centuries has only recently been revealed as a mass movement. We now apply to many kinds of services the philosophy of large-scale production. We have integrated these services and organized them, and we have developed the new philosophy to such a degree in recent years that we now have what might be termed "mass services." These have helped to create a new standard of comfortable living in the United States, and have afforded employment for millions of workers crowded out of agriculture and the extractive and fabricating industries.

It was, in fact, the timely development of "mass services" which saved our country from a critical unemployment problem during recent years.

No serious cyclical fluctuations have characterized the period under review, so that the unemployment due to the business cycle has not been marked; but it has become evident that unemployment can arise as a result of industrial efficiency as well as of inefficiency. In the latter case we have seasonal or intermittent unemployment; in the former case what has come to be known as "technological" unemployment resulting from the introduction of new machinery and processes. The survey seems to indicate that the time has come to devote continuing attention not only to the problems of cyclical unemployment but also to this newer problem of "technological" unemployment if we are to forestall hardship and uncertainty in the lives of the workers.

Where progress may be working an advantage to the people as a whole, it inevitably works temporary hardship upon certain classes—those skilled workers in a trade, for example, whose work is taken over by machines. This is a serious aspect of the problem of unemployment. It involves, in many instances, learning new trades, and, in most instances, the loss of time in securing other jobs. Yet from a broad social point of view, while it works hardship on those workers displaced by the introduction of machinery or improved processes, the social gain is real and permanent.

Such economic transformations are not so much changes as readjustments, due to the progressive needs of modern society, and to the necessity of taking advantage of the modern developments in science. They have arisen in agriculture as well as manufacturing and transportation, and they have affected employers as well as employees. There is nothing new about these problems; the accelerated rate of readjustment is what has recently engaged the attention of wage earners and management.

As has already been intimated, the acceleration of technological shifts in production and consumption would have resulted in much more serious unemployment if workers had not been absorbed in the newly expanded service industries which both create and serve leisure.

### Our Natural Advantages

It is obvious, of course, that the economic position of this Nation is in no slight degree due to our possession of abundant raw materials and sources of power, to the fact that our domestic market is so large, and that there are no trade barriers between the States of our Union. We can exchange goods without stopping them for inspection or the payment of duties between States. We can effect their transfer without the barriers of differing languages or customs. Advertising is peculiarly effective because we have so great an area with a common language which enables us to talk to all the people and to develop national consumption habits, which in turn make possible large-scale production.

This fortuitous situation should be borne in mind as an important factor in both the speed and the spread which have characterized our recent economic development.

The balance which has been maintained between consumption and production is nowhere better shown than in the fact that wages have been rising, and that there has been no striking increase of unemployment in a period marked by the broadest technological advancement which we have yet known.

Perhaps the deepest economic significance of the new situation lies, not in the rapidity with which the service industries have grown and have become integrated, nor in the universality of their spread, but in the fact that the situation which they have created is reciprocal. Our increasing standard of living is not participated in only by those who produce our food, clothing, and shelter, but has flowed back to those in the service industries. The population as a whole can enjoy the rising standard of living—the music which comes in over the radio, the press, the automobile and good roads, the schools, the colleges, parks, playgrounds, and the myriad other facilities for comfortable existence and cultural development.

Our ancestors came to these shores with few tools and little organization to fight nature for a livelihood. Their descendants have developed a new and peculiarly American type of civilization in which services have come to rank with other forms of production as a major economic factor.

### Remote Saturation Points

The survey has proved conclusively what has long been held theoretically to be true, that wants are almost insatiable; that one want satisfied makes way for another. The conclusion is that economically we have a boundless field before us; that there are new wants which will make way endlessly for newer wants, as fast as they are satisfied.

We have the power to produce and the capital to bring about exchange between the producing and consuming groups. We have communication to speed and spread the influence of ideas. We have swift and dependable transportation. We have an educational system which is steadily raising standards and improving tastes. We have the sciences and arts to help us. We have a great national opportunity.

Important as is the development of the economic side of our national life, through invention and discovery of new industries and new callings, an illustration of the potentialities of further lifting the national standard of living, without developing another invention or discovery and without creating a new want, can be drawn from a single industry—that of electrical appliances.

A home or farm wired for electricity is a different economic unit from one which is not wired. Each such home, whether in city or country, can take advantage of electricity for lighting, and on the farm an automatic water supply system makes available water at convenient spots for domestic and farm uses.

A survey of city and village homes indicates the use of electricity for many additional applications of highly specialized devices. In 1928 apparently a large percentage of the homes wired for electricity had electric flatirons; less than one-third of them had washing machines; slightly over one-third of them had vacuum cleaners; less

than 5 per cent had electrical refrigerators. We are far from the saturation point in connection with any of these devices.

To take one other example, there is, perhaps, no more dramatic illustration of a rising standard of living than the growth and development of radio in recent years. This newest application of electricity has found its way into millions of homes. On January 1, 1928, there were 7,500,000 sets in use. Yet about 70 per cent of American homes are still without the radio.

We seem only to have touched the fringe of our potentialities.

## Section III.—Economic Balance

MANY INFLUENCES have been at work during the period covered by the survey, welding the people of the United States into a new solidarity of thought and action. The telephone and telegraph, the automobile, the radio, and the railroads form lines of communication which have brought together East and West, South and North.

Other and less tangible influences reaching back farther into the past, but accelerated and strengthened by the experiences of the World War, have also contributed to our solidarity. Economic reorganization; the cooperation of business leaders, economic experts, and the Government; the general spread of information; the growth of trade associations; the cooperation of labor to increase productivity; the restriction of immigration—all of these have grown in importance in peace after their stimulation by the war.

Making for solidarity has been popular education which has increased amazingly. We are spending two and one-half billions of dollars each year on public and private education—an increase of 250 per cent in a decade. Expenditures for free college and university education have increased nearly 350 per cent in little more than 10 years.

And there is another factor which has contributed to the welding process, and to the economic advancement of the nation: The broadening influence of America's creative minds—the minds of the leaders in Government and in education, in research, in management and in labor, in the press, and in the professions. To their influence we have come to look in large measure for the maintenance of our economic balance.

While ours has been a period of great economic activity and industrial productivity, and of a degree of economic stability which must be rated as high when we consider the readjustments in every department of economic life made necessary by the postwar crisis and by the transition from war economy to peace economy, and while America has a promising future, the outstanding fact which is illuminated by this survey is that we can not maintain our economic advantage, or hope fully to realize on our economic future, unless we consciously accept the principle of equilibrium and apply it skillfully in every economic relation.

The forces that bear upon our economic relationships have always been sensitive. All parts of our economic structure, from the prime processes of making and of marketing to the facilitating functions of finance, are and have been interdependent and easily affected. And therein lies the danger: That through ignorance of economic princi-

ples, or through selfish greed, or inadequate leadership, the steady balance will be disturbed, to our economic detriment.

If natural resources, especially the land, are wastefully used; if money in quantity is taken out of production and employed for speculation; if any group develops a method of artificial price advancement which puts one commodity out of balance with other commodities; if either management or labor disregards the common interest—to this extent equilibrium will be destroyed, and destroyed for all.

To maintain the dynamic equilibrium of recent years is, indeed, a problem of leadership which more and more demands deliberate public attention and control. Research and study, the orderly classication of knowledge, joined to increasing skill, well may make complete control of the economic system a possibility. The problems are many and difficult, but the degree of progress in recent years inspires us with high hopes.

In the marked balance of consumption and production, for example, the control of the ecomonic organism is increasingly evident. With the development of a stream of credit to facilitate business operations, and with flexible power to energize industry and to increase the effectiveness of the workers has come an increasing evenness in the flow of production. Once an intermittent starting and stopping of production-consumption was characteristic of the economic situation. It was jerky and unpredictable, and overproduction was followed by a pause for consumption to catch up. For the seven years under survey, a more marked balance of production-consumption is evident.

With greater knowledge of consuming habits, with more accurate records of the goods consumed, a sensitive contact has been established between the factors of production and consumption which formerly were so often out of balance.

Where pools of goods once were accumulated by the manufacturer, the wholesaler, the jobber, and the retailer; where high inventories once meant distress, shutdowns, failures, and unemployment whenever the demand subsided, there is now a more even flow from producer to consumer.

Increasing skill and scientific data have made the anticipation of demand far more accurate, and by accurate anticipation the deliberate balance between production and consumption has in a measure been maintained. By advertising and other promotional devices, by scientific fact finding, by a carefully predeveloped consumption, a measurable pull on production has been created which releases capital otherwise tied up in immobile goods and furthers the organic balance of economic forces. In many cases the rate of production-consumption seems to be fairly well under control.

To maintain this balance, and to extend it into fields which are not now in balance with the more prosperous elements of the Nation, is clearly an important problem of leadership. With certain natural resources still wastefully exploited, with great industries, such as agriculture and coal mining, still below the general level of prosperity, with certain regions retarded, there remains much to do. To bring these more fully into the stream of successful economic forces is a problem of the first order.

Our complex and intricate economic machine can produce, but to keep it producing continuously it must be maintained in balance. During the past few years equilibrium has been fairly well maintained. We have not wasted the hours of labor by strikes or lockouts. Until recently we have not diverted savings from productive business to speculation. There has been balance between the economic forces—not perfect balance, but a degree of balance which has enabled the intricate machine to produce and to serve our people.

As long as the appetite for goods and services is practically insatiable, as it appears to be, and as long as productivity can be consistently increased, it would seem that we can go on with increasing activity. But we can do this only if we develop a technique of balance. Toward such a technique the committee believes the skillful work of the economists, engineers, and statisticians who prepared the survey on which we have based the facts and interpretations expressed in this brief report, will contribute. Our effort has been to suggest a pattern by which their work may be appraised; to set up an orderly plan by which the facts may be articulated and against which later and better information may be more accurately judged. We recommend a study of the fact-finding survey as a whole to all who are faced with the problems of business administration and public leadership.

Informed leadership is vital to the maintenance of equilibrium. It depends upon a general knowledge of the relations of the parts each to the other. Through incessant observation and adjustment of our economy, we can learn to maintain the economic balance.

Underlying recent developments is an attitude of mind which seems to be characteristically American. Our Nation is accustomed to rapid movement, to quick shifts in status; it is receptive to new ideas, ingenious in devices, adaptable. Our economy is in large measure the embodiment of those who have made it.

Our situation is fortunate, our momentum is remarkable. Yet the organic balance of our economic structure can be maintained only by hard, persistent, intelligent effort; by consideration and sympathy; by mutual confidence, and by a disposition in the several human parts to work in harmony together.

# INDUSTRIAL AND LABOR CONDITIONS

## Effect of Rayon on Consumption of Cotton, Silk, and Wool

A RECENT report of the Metropolitan Life Insurance Co.[1] contains a discussion of the possible effects of rayon on the consumption of other textile fibers. A comparison of the amount of cotton, silk, and rayon consumed in the years 1923 to 1927 shows a considerable increase in all three during this period—13.5 per cent for cotton, 51.7 per cent for silk, and 163 per cent for rayon—but the increase in the consumption of rayon was twelve times that of cotton and three times that of silk. In spite of the rapid strides made by rayon, however, the volume consumed in 1927 was only 2.7 per cent of the volume of cotton, although it exeeeded that of silk (for the first time) by approximately 39.8 per cent.

The effect of rayon on the consumption of cotton is uncertain, although it is believed by some that it may operate to increase rather than decrease cotton consumption and that any displacement of cotton by rayon may be offset by the increased sales of cotton-rayon mixtures. In fact, a number of cotton manufacturers are reported to "maintain that rayon has been the salvation of their industry. These manufacturers base their conclusions on the belief that rayon has made the finished mixed fabrics far more attractive and hence more salable than the formerly plain cotton fabrics. Whatever the underlying causes, there is evidence that an increasing number of cotton mills are using rayon in large quantities, but the total consumption of cotton fibers has shown no decline."

The report credits the Silk Association of America (Inc.) with the statement that consumption of the cheaper grades of silk fibers has been adversely affected by rayon competition but that consumption of high-grade raw silk has increased. In certain instances rayon has tended to displace raw silk in the manufacture of cotton finished goods. A number of cotton manufacturers who formerly used large quantities of Canton and tussah silk for the production of fancy cotton and silk mixtures and for the manufacture of shirtings now use rayon because of the lower price of rayon yarn.

The effect of rayon on wool consumption is still apparently negligible, according to the report, inasmuch as the use of rayon in mixtures with woolen fibers is a comparatively recent innovation. The present consumption of rayon in the woolen industry is only 1 per cent of the total consumption of rayon, this percentage having remained the same for the last four years.

The percentages of the total rayon production utilized in the knitting and weaving trades, for braids and elastics, and for miscellaneous purposes are shown in the following table. It will be noted that the knitting trades furnish the most important market for rayon

[1] Metropolitan Life Insurance Co. Policyholders Service Bureau. Rayon—a new influence in the textile industry. New York [1929?].

yarn, their consumption amounting to 54 per cent of the total American rayon production in 1927 as compared with 37.5 per cent utilized by the weaving trades.

PERCENTAGE DISTRIBUTION AMONG THE DIFFERENT TEXTILE INDUSTRIES OF AMERICAN-PRODUCED RAYON, 1924 TO 1927

| Industry group | Per cent of total rayon production | | | |
|---|---|---|---|---|
| | 1924 | 1925 | 1926 | 1927 |
| Knitting trades: | | | | |
| Underwear | 10.0 | 12.0 | 24.0 | 29.0 |
| Hosiery | 22.5 | 26.0 | 24.6 | 21.0 |
| Other knit goods | 14.0 | 6.0 | 3.5 | 4.0 |
| Weaving trades: | | | | |
| Cotton goods | 15.5 | 25.5 | 22.5 | 22.5 |
| Silk goods | 18.5 | 16.5 | 13.5 | 14.0 |
| Woolens | 1.0 | 1.0 | 1.0 | 1.0 |
| Braids and elastics | | | 1.5 | 2.0 |
| Miscellaneous | 18.5 | 13.0 | 10.0 | 6.5 |

Although the proportions of the total American rayon output utilized in the manufacture of hosiery and of silk goods in 1927 were smaller than in earlier years, the actual amounts used increased very materially. The hosiery industry used 17,833,000 pounds of rayon in 1927 as compared with 8,665,000 pounds in 1924, and the silk goods industry, 11,889,000 pounds, as compared with 7,125,000 pounds in 1924. The actual amounts of rayon used by the knit underwear and cotton goods industries increased still more notably between 1924 and 1927—in knit underwear from 3,851,000 to 24,627,000 pounds and in cotton goods, from 5,969,000 to 19,108,000 pounds.

## Institute of Human Relations at Yale University

AN INSTITUTE of Human Relations has been established at Yale University, according to the Personnel Journal of April, 1929 (p. 492). This new organization will, the president of that university announces, "bring together sociologists, biologists, psychologists, and economists, who will combine with their colleagues in such fields as law, medicine, and psychiatry to correlate knowledge of the mind and body and of individual and group conduct and to study further the interrelations of the many factors influencing human actions."

A grant of $1,500,000 has been made by the Rockefeller Foundation for a building in which the institute will be housed. Furthermore, funds aggregating $250,000 per annum for a 10-year period have been made available for the continuation and extension of the work of the Institute of Psychology, the researches in child development, and the program for mental hygiene which are already in progress, and to bring about cooperation among various departments of the university in the study of human nature, especially in connection with the fields of law and medicine.

## Collection of Wage Claims in California

IN THE biennium ended June 30, 1928, the great bulk of the complaints received by the several district offices of the California Bureau of Labor Statistics were with reference to unpaid wages.[1] The California laws provide that wages be paid in cash or negotiable paper to be paid on demand, with no discount, at a bank or established business place. They also provide that upon an employee's discharge "the wages or compensation for labor or service earned and unpaid at the time of such discharge shall become due and payable immediately." When an employee who has no written contract quits or resigns his job his wages are "due and payable not later than 72 hours thereafter, unless such employee shall have given 72 hours' previous notice of his intention to quit, in which latter case such employee shall be entitled to his wages or compensation at the time of quitting."

Section 7 of the wage collection law of the State (Stats. 1919, ch. 228) reads as follows:

> The commissioner and his representatives duly authorized by him in writing shall have the power and authority, when in his judgment he deems it necessary, to take assignments of wage claims and prosecute actions for the collection of wages and other demands of persons who are financially unable to employ counsel in cases in which, in the judgment of the commissioner, the claims for wages are valid and enforceable in the courts; to issue subpoenas, to compel the attendance of witnesses or parties and the production of books, papers or records, and to administer oaths and to examine witnesses under oath, and to take the verification or proof or instruments of writing, and to take depositions and affidavits for the purpose of carrying out the provisions of this act and all other acts now or hereafter placed in the bureau for enforcement.

The collection of these wage claims takes up nearly all the time of the staff of the State bureau of labor statistics and is considered by that office its most important accomplishment. From 1915 to 1928 $5,753,666 were collected by the bureau in unpaid wages without cost to the claimants.

During the 7-year period ending June 30, 1921, the average yearly collections of unpaid wages were $176,449, while for the following seven years ending June 30, 1928, the collections of such wages averaged $645,503 per annum—an increase of 266 per cent over the earlier 7-year period.

During the fiscal years 1927 and 1928 there were 57,189 wage claims handled as compared with 41,507 in the previous biennium—an increase of 37.8 per cent in the later period.

In the fiscal years 1927 and 1928 the amount collected totaled $1,962,992 and in the two preceding fiscal years $1,468,551—an increase of $494,442, or 33.7 per cent for the later period.

During the fiscal years 1927 and 1928, the percentages of wage claims collected of the totals received were, respectively, 59.1 and 60.1. During both of these fiscal years the increases in the percentages of wage claims collected were greater than in the preceding two fiscal years. Both fiscal years 1927 and 1928 show increases in the amounts of unpaid wages collected over the preceding fiscal years, but the rates of these increases were considerably smaller during 1927 and 1928 compared with the preceding fiscal years. Thus, while between 1925 and 1926 the percentage increase in the amount of unpaid wages collected was 38.5, between 1926 and 1927 the percentage increase in the amount of unpaid wages collected was 10.4, and between 1927 and 1928, the percentage increase in the amount of unpaid wages collected was 4.4.

[1] California. Department of Industrial Relations. Bureau of Labor Statistics (division of labor statistics and law enforcement). Twenty-third biennial report, 1927–1928. Sacramento, 1929, pp. 56–78.

### Proportion of Claims Settled

IT IS, of course, not possible to collect all wage claims. Some of them, after investigation, are found to have no merit. On the other hand, many of the claims are not presented until after the employer is insolvent. During the fiscal years 1927 and 1928 approximately 60 per cent of the total claims received were settled or collected.

### Size of Claims

OF 48,598 wage claims filed at the various district offices in the calendar years 1926 and 1927, slightly over 37 per cent were under $25, while 55.2 per cent were for less than $45. Only 7.2 per cent were for amounts exceeding $225.

### Occupations of Complainants

OF THE 57,189 persons filing claims in 1926–27 and 1927–28 for unpaid wages, 41.7 per cent were workers in the manufacturing and mechanical industries, 13.2 per cent in agriculture, forestry, and animal industry, and 12.6 per cent in domestic and personal service, 9.6 per cent in trade, and 7.6 per cent in professional service. In each of the remaining industries the proportion of claimants was under 7 per cent. Of the agricultural workers filing claims, 70.9 per cent were fruit pickers and farm hands.

The largest numbers of wage complainants in the manufacturing and mechanical group were, in order named, laborers, carpenters, painters, cooks, plasterers, foremen, and managers. Of the 4,348 wage complainants in the professional service group, 2,316, or 53.3 per cent, were nurses; 474, or 10.9 per cent, were musicians; while 453, or 10.4 per cent, were actors.

### Savings to California Workers

AS ALREADY stated, the sum of $1,962,992 in unpaid wages was collected by the bureau of labor statistics in the fiscal years 1927 and 1928 without charge to the workers filing the claims. If these complainants had had recourse to legal actions, the fees in most cases would probably have been from one-fourth to one-third of the sums collected. In some cases the fees would probably have been only 10 per cent of the sums collected, while in other cases attorneys would have charged over 33 per cent. It might therefore be estimated that the bureau's wage collection activities saved the workers of California from one-fourth to one-third of the unpaid wages collected by that office or, for the last two years, from $245,374 to $327,165 per annum.

### Civil Actions and Penalties

IN ACCORDANCE with the California wage payment laws, the State labor commissioner may prosecute actions for unpaid wage claims which have been assigned to him for collection. In the two fiscal years ending June 30, 1928, the bureau began 331 civil actions in the interest of 1,999 wage claimants, involving $237,360 of which $33,539 were collected.

An important provision of the California semimonthly pay-day act is that imposing a fine of $10 for each failure to pay each employee semimonthly.

Civil actions to recover penalties under this provision of the law are to be instituted by the commissioner of the bureau of labor statistics, and the moneys recovered thereby are to be forwarded to the State treasurer to become a part of the general fund of the State. Regarding these penalties, the law further provides that, "several causes of action for the said penalties may be united in the same action without being separately stated and a demand shall be necessary as a prerequisite to the bringing of any action for such penalties, the commissioner being hereby given full power on behalf of the State to accept and receipt for any penalties so paid, with or without suit."

Under the provision which was passed by the 1927 legislature the bureau collected $6,051.35 up to July 1, 1928, without suits. These fines were paid by 328 employers who had violated the semimonthly pay-day law.

# PRODUCTIVITY OF LABOR AND INDUSTRY

## Labor Productivity in Boot and Shoe Making Before the Invention of Machinery

DOCUMENTARY material on boot and shoe making in the first quarter of the nineteenth century affords some data on productivity of hand workers before the invention of shoemaking machinery.

Joseph Lye was a skilled shoemaker of Lynn, Mass., doing only custom, or "bespoke," work. He kept a diary, after the fashion of his time, from which can be obtained an idea of productivity, at least of one individual shoemaker who was probably representative of the craft. Entries in the diary from 1817 to 1822 show that Lye's usual daily output was two pairs of shoes, although he sometimes made 3 pairs, and one day he records making "2 pairs of village walking boots at 45 cents, 2 pairs military at 40 cents." At that rate, the usual daily earnings of a good shoemaker, working for himself on bespoke work in his own shop, would be 80 to 90 cents. Two of Lye's entries read: "This week's work comes to $5.87 exclusive of other work"; "this week's work amounts to $5.40"—items which in both cases refer only to his earnings at the shoemaking trade.

The transcript of testimony in the trial of the Journeyman Cordwainers of Philadelphia in 1806 contains specific data on the time element in the hand manufacture of the elaborate boot in fashion at the time. A pair of ordinary long boots, known as "Cossacks," was "reckoned at three pairs of shoes" in the matter of time, in fixing piece rates. The "backstrap," the style of boot involved in the wage controversy out of which the conspiracy trial grew, was much more elaborate than the Cossack.

An occasional employer had his journeymen work on his own premises in a crude sort of factory, but the more usual custom was for the journeymen to work in their own homes on material furnished by the employer already cut. The finished work was then returned to the employer.

During the course of the trial one of the employer-plaintiffs was asked how much his journeymen earned in a week. He replied:

> I have had them earn but $6 and $7, but some have earned $11.25 and $12 a week; a good workman may earn $11.25 a week, for a good workman can make 3 pairs of backstrap boots a week, which, at $3.75 a pair, is $11.25.

A journeyman called upon as a witness was asked: "How many hours a day must a man work to earn $11.25 a week?" He answered, "I could not earn $10 at the present rates if I was to work all the 24 hours of the day." Another journeyman testified:

> A man can not make a pair of backstraps under three days, setting steadily, late and early. I can not make $12 a week, and I much doubt if any man can on full-dress, fancy-top, backstrap boots.

A third said:

> I work very hard, and later hours than other men. At most I earn but $10 a week. I don't remember I ever earned $11.25. In common I could not make more than $7 or $8; on an average I can not earn more than $9.

Admitting, in answer to a question, that a fellow worker had earned more, he added, "but he had to work on Sundays to do it." It had taken him two weeks, he continued, to finish and deliver four pairs of boots.

When fancy-top boots came into fashion in the summer of 1805, the employers granted an advance of 50 cents above the prevailing rate on backstrap boots for the new model. According to one witness who worked on fancy-top boots at the price originally fixed:

> I * * * could only make $8.50 a week, and I worked from 5 in the morning until 12 or 1 at night. I can not make more than two pair a week.

The employers' attorney asked him if he was "a smart workman," and he replied: "Not too fast or too slow; just middling or so, like the common run."

The scale current in 1805 and the proposed increase which the employers, through a general agreement, refused to grant, were:

| | Current scale | Proposed scale |
|---|---|---|
| Fancy tops | $4.25 | $5.00 |
| Backstraps | 3.75 | 4.00 |
| Long boots | 2.75 | 3.00 |
| Cossacks | 2.75 | 3.00 |
| Bootees | 2.50 | 3.00 |

Evidence was introduced to show that the new prices asked by the Philadelphia cordwainers were the rates then prevailing in New York and Baltimore. In this connection the statement was made that, "considering how much dearer house rent, firing, and marketing is at those places, the journeymen in Philadelphia have the advantage even at the present rates."

The strike was lost, and in the conspiracy trial brought by the employers the following year, the leaders of the cordwainers' organization were found "guilty of a combination to raise their wages" and fined "$8 each. with costs of suit."

## Eliminating Labor in Wrecking Operations

AN IMPORTANT successful labor-saving experiment has recently been tried in Cleveland in a building wrecking operation. The details of this ingenious scheme are given in the August, 1928 (pp. 92–93), issue of American Builder, from which the following data were taken.

A Cleveland contractor, fearing he would not complete in a specified time the wrecking of a 4-story warehouse, decided to operate a crane from the top of the building. He had undertaken at first to tear down the building with a force of 50 men with pneumatic drills, sledges, and picks. After two weeks' work only a small part of the rather light weight roof had been broken through. At that rate he realized that the wrecking work and the hauling of the salvaged material would take eight or nine months instead of the three months stipulated in the contract.

> The entire building was used as a refrigerator, consequently brick walls were 2 feet thick and lined with cork, and floors were of 2 layers of 8-inch reinforced concrete with a layer of cork in between; thus the floors would require even more effort to break through than the roof did. Each floor was 80 feet by 150 feet square.

Fearing a serious financial loss as a result of not finishing his work on time, the idea occurred to the contractor he might hoist a light crane with about a 1,500-pound skull cracker to the top floor of the warehouse. A portable 5-ton crane mounted on a truck was rented by the day, and a moving and transfer company was finally induced to undertake the job of pulling the truck crane up on 20 by 20 inch timbers 62 feet long to the top floor of the warehouse.

After raising the crane each several feet the winches would stop and timbers, cable, blocking, and truck crane wheel would be inspected for strain and stability. When the unit was about 15 feet up the timbers, the operator who was guiding the crane truck decided definitely that a safer place for him to be was on the ground. Consequently, for the rest of the 62 feet distance the truck was guided by ropes thrown around the hub and spokes of each front wheel. Riggers pulled on the ropes to turn the truck wheels. Finally the crane was rolled over the top end of the timbers onto the concrete floor of the building. There it stayed. Before the day was over all riggers' equipment was cleared away and the crane was ready to go to work the next morning.

The skull cracker was skillfully swung and dropped by the crane operator, who wigwagged the boom back and forth in such a way as to increase the momentum for the weight. "Then suddenly, with a final swing of the boom and release of the crane holding drum brakes, it would fly out to its mark beyond." At every crash probably 18 to 24 square feet of wall 24 inches thick would break and fall from the top floor to the ground. With one blow the skull cracker accomplished as much as two men in an hour and a half. Twelve days after work had been begun with the crane the walls of the fourth story were demolished and its floor broken through except for the corner in which the crane was standing.

The problem of lowering the crane to the third floor, which was 12 feet below, was almost parallel to the problem of raising the crane to the top of the building. Two 20-foot timbers, 12 by 12 inches square, were set in place by riggers and one winch truck, similar to the two first used, lowered the crane down to the third floor. Four hours' time was consumed in this move. Then the crane was ready to demolish the third floor.

In another 10 days the third story was knocked away except the corner for the crane.

Just one day after operations were begun with the crane on the top floor of the warehouse, the contractor dismissed 38 of his hand laborers, retaining but 12 of his original crew to tear down doors and moldings, sort salvage, etc. It was found to be too expensive to continue to employ men as wreckers, for the crane was accomplishing "the work of 100 men at one-eighth of their cost."

It was reported on June 23 that the crane was ready to be lowered to the ground floor, that another crane with a half-yard bucket was loading the débris into trucks to be carried away, and that nearly all of the building material of any value had been salvaged and sold. This new idea in wrecking operations is declared to be a "money maker."

## Increased Productivity in the Dairy Industry

By C. W. Larson, National Dairy Council

OF ALL the branches of agriculture the position of the dairy industry is most outstanding. Unlike other fields of agriculture, there have not been surpluses during the last few years. Production of dairy products has increased tremendously but the demand for the product has increased more.

The efficiency of production in agriculture has been encouraged throughout the land the same as in other lines of business and still average yields have not increased much. Of course, this is partly due to the fact that marginal acreage of less productive land has been put into use. From the standpoint of efficiency in dairy production, however, remarkable progress has taken place in spite of the fact that to secure improvement in efficiency of production of milk is much more difficult. It takes five or six years, for instance, before the offspring of a dairy sire is in milk and can show whether her inheritance is for high or low production. There is also greater difficulty in measuring improvement through better methods of feeding and breeding. When a different tillage method is tried in growing a crop, for instance, or when different seed is tried, the results can easily be measured at the end of the year. The farmer who uses one variety of seed on 40 acres and another variety on another 40 acres simply notes the number of bushels threshed from the two fields and has at once a measure of the two varieties of seed. In like manner, in the handling of other crops and other livestock the results and the yield are obtained without additional trouble or cost.

To make definite and satisfactory progress in feeding and breeding of dairy cattle, however, it is necessary to know the daily production and the amount of feed consumed. This requires unusual attention to weighing and bookkeeping, but in spite of these handicaps splendid progress has been made in the increase in production per cow. The dairy cow may be considered a machine for the production of milk and the greater her annual production the greater the economy. This is true with the dairy cow even to a greater degree than with the machine in the factory. The dairy cow that produces 4,500 pounds of milk a year, which is about the average of the country, requires the same overhead and the same barn space as the cow which produces twice that much. It is also significant that her production can be doubled with about the same amount of labor. It takes about the same length of time with the cow that produces the larger amount or the smaller. There is a slight difference—the cows with the larger production for the year may be in milk over a little longer period of time—the good cow being in milk 300 days each year, and the poor one usually a shorter time. The labor of cleaning the cows and barn is the same with the high or low producer.

Even more interesting is the subject of the raw material used to make the product. With a machine I suppose it takes twice the amount of raw material to make twice the product, but from an actual study of 100,000 cows of which complete records have been kept it was found that cows producing 9,000 pounds of milk, which is twice the average production, actually consumed only 40 per cent more feed. Of course, the reason for this is that a certain proportion of the feed is used to

maintain the animal and it is only that amount consumed above this need that is converted into milk.

The dairy cow is the foundation of the dairy industry and her average life is seven years. Taking, therefore, the last seven years, 1921–1927 (figures for 1928 are not yet available), as the basis for the trend of the industry, the following facts are significant. During this period of seven years there has been a remarkable increase in the production and consumption of milk and milk products. The increase in population, together with the increase in per capita consumption, now requires 30,000,000,000 pounds more milk. This would require over 6,000,000 additional average cows, but as a matter of fact, on January 1, 1920, there were on farms in the United States 21,788,000 cows, and on January 1, 1927, 21,948,000, or an increase of only 160,000. This means that through increases in production per cow brought about by breeding, feeding, and management, the dairy farmers have increased production 30,000,000,000 pounds with 5,840,000 fewer cows than it would have been necessary to house, feed, and care for under the average of seven years ago.

It is significant that production economies can be continued on this same basis for many years to come. The 100,000 cows already referred to that have been under observation where records have been kept increased their production 200 pounds a year. It is more difficult to increase the production of such animals because they are already high producers—but if the production of the average cow is increased only half this amount or 100 pounds a year we could go on for 40 years supplying an additional population of as many as 2,000,000 people each year and at the end of 40 years the average production of the cows of the country would need to be only 8,500 pounds, and we now have many cows producing as high as three and four times this amount. The slogan of the dairy industry is not more, but better, cows.

Through the systematic work of the industry this progress in economy and efficiency in production has taken place.

# LABOR TURNOVER

## Do Workers Gain by Labor Turnover?

By H. La Rue Frain, of the University of Pennsylvania

THE disadvantages of labor turnover have been expounded so emphatically and extensively that one may well wonder if there is only one side to the question. To a large extent available information has come from the experience of individual plants. On this basis it is usually true that per unit costs of production are higher for new than for experienced workers, and it is also likely to be the case that the wages (hourly and weekly) tend to be lower for new than for experienced employees. Since this seems to be the common experience of plants, it is often argued that turnover is costly not only to management, but also to the workers. It is said that "a rolling stone gathers no moss."

But such a conclusion assumes, among other things, that all plants are equally attractive and profitable to the workers. To show satisfactorily that workers may gain by moving about, it is necessary to have a continuous record of their earnings and working opportunity over a considerable period of time. Only then is it possible to trace a worker from place to place and to compare his economic status before and after the change.

Perhaps the first published study of this kind has just come from the Industrial Research Department of the University of Pennsylvania, with Miss Anne Bezanson, associate director of the department, as author.

For the years 1926 and 1927 both the members and the officials of the upholstery weavers' union cooperated in supplying information, week by week, of earnings and working time for the individual weavers in the Philadelphia market. This industry is somewhat localized and intensely competitive. Weavers are highly skilled, and substantially all of them in the Philadelphia area are members of the union. Uniform piece rates are paid for the same fabric by all mills. Some of these circumstances made it possible to obtain information of a most unusual nature, while others cause the findings to have rather general importance.

In this study, entitled "Earnings and Working Opportunity of Upholstery Weavers," Miss Bezanson challenges the customary view that labor turnover is disadvantageous, especially to the workers. While not denying that such may be the case under some circumstances and from some standpoints, still the author contends that frequently weavers gain by moving from plant to plant—a conclusion based upon extended analysis.

It is shown that wage levels were not the same in all mills either in 1926 or 1927 and that mills tended to hold their same relative position in both years. For convenience of analysis the mills are grouped into three classes—high, medium, and low wage mills—and this classification is used throughout the study.

Whatever the reasoning may be on the part of the workers when they move from mill to mill, the fact remains that in 1926—a more prosperous year than 1927—more men entered high-wage mills than left these mills, while the reverse was true for low-wage mills, and the number of men entering and leaving medium-wage mills was fairly well balanced.

The question immediately arises as to how the workers fared by moving. Even if a worker left a low-wage mill and entered a high-wage mill but did not increase his weekly earnings it would seem that there was no gain by the movement. Here a categorical answer can not be given. The answer to this question, like that to several others, depends on the status of the mill left and also on the status of the mill entered. A larger proportion of the men from low-wage mills gained in weekly earnings when they entered high or medium wage mills than did the men from high or medium wage mills. On the other hand, weavers tended to lose in weekly earnings by going to low-wage mills, except when they came from other mills in the same class.

While more men gained in weekly earnings by moving than lost, still the source of these gains was not the same in all cases, it being influenced by the class of mill from which the workers came and the class of mill they entered. Thus men who left high-wage mills and entered other high-wage mills improved chiefly their working time, while men from medium and low-wage mills increased principally their hourly rates. When men left high-wage mills and went to medium-wage mills the chief gains came in greater working time; for the men from low-wage mills the gains were in both working time and hourly rates, while for men from other medium-wage mills there was a tendency to gain in hourly rates. But from whatever class of mill the workers came, when they went into low-wage mills the chief source of gain was in working time, although in general a net loss in weekly earnings was sustained by entering mills of this class.

It appears that both higher hourly earnings and increased working opportunity are forces pulling men to some mills and away from others. And when men can go from low-wage mills and improve their earnings (hourly and weekly) in other plants, there is some justification for the belief that their former low earnings are not entirely due to their ability but that working conditions may have played an important part. Especially is this likely to be the case where short-service men in high-wage mills earn more than long-service men in low-wage mills. On the other hand, when the earnings of men are relatively low wherever they work—whether high or low wage mills—there is some reason to suspect that the difficulty is with the workers. Both of these situations occur, but it appears that a very considerable portion of the men moving about were not the poorly paid weavers, as is frequently supposed, but the better paid men who were, perhaps, ambitious to increase their weekly earnings by taking advantage of opportunities as they presented themselves.

In short, while all men who changed their places of employment did not improve their economic status and while not all who gained in weekly earnings did so in the same way, it still appears that to an appreciable degree rolling stones did gather moss in the sense of improving weekly earnings.

While it would be unwarranted to argue that the conclusions reached in this single study are universally true, yet it is rather significant that in perhaps the first study of its kind the customary view of labor turnover is not supported so far as many of the workers are concerned. From the standpoint of social policy the question may well be raised as to whether this rather haphazard method of allocating labor where it is most needed is the most satisfactory one which might be employed. But at any rate there is some indication that an important economic function is actually being performed in the absence of deliberate direction, and with considerable evidence of net gain to the workers.

# WOMEN IN INDUSTRY

## Woman Workers in Flint, Mich.

UNDER this title the United States Women's Bureau has recently published the results of a study made in the latter part of 1925 and the beginning of 1926 in the city of Flint, Mich., by the Women's Bureau and the local Young Women's Christian Association, at whose request the work was undertaken. Two other local organizations, the chamber of commerce and the industrial bureau, cooperated in the study. Information was obtained from three sources—from the employers, from cards distributed to the women in the plants visited, and from the workers during visits to their homes.

Flint has two outstanding characteristics which make this study of significance: It is a city of rapid growth, the population of 1920 being something over nine times that of 1890, and it is practically a city of a single industry, the manufacture of automobiles. The condition of this industry affects the whole life of the city. When it is active transients flock into the town, and stores, restaurants, laundries, and all the incidental occupations are busy. When times are dull in the auto industry, hands are laid off, and the whole city suffers.

The investigation covered 138 establishments, employing in all 29,048 workers, of whom only 2,814, or 9.7 per cent, were women. The following table shows the distribution of the women among the different kinds of employment:

INDUSTRIAL DISTRIBUTION OF WOMEN STUDIED

| Industry | Number | Per cent |
|---|---|---|
| Manufacturing: | | |
| Automobiles and accessories | 1,751 | 62.2 |
| Other | 152 | 5.4 |
| Stores: | | |
| General mercantile | 280 | 10.0 |
| 5-and-10-cent | 138 | 4.9 |
| Other | 128 | 4.5 |
| Laundries | 147 | 5.2 |
| Restaurants | 218 | 7.8 |
| Total | 2,814 | 100 |

These figures show pretty accurately the situation as to the employment of women in Flint. In the automobile industry women were employed almost wholly in the manufacture of accessories, in which, unlike the manufacture of automobile bodies, the proportion of women is high.

### Hours and Earnings

EMPLOYMENT in restaurants differed in so many respects from employment in the other industries that the restaurant workers are omitted from the general tables as to hours and earnings. Taking the women employed elsewhere, only 2.8 per cent had a working day of

8 hours or less, 40 per cent had over 8 but under 9 hours, 55.1 per cent had 9 hours, and 2.1 per cent had over 9 hours. The 9-hour day prevailed for 70.2 per cent of the women in auto plants and for 70.1 per cent of those in laundries. In the latter employment, 18.4 per cent had daily hours exceeding 9. In the stores the prevailing daily hours were over 8 but under 9. A shorter day on Saturday was common in manufacturing plants and laundries, but unusual in the stores.

Because of the short Saturday, weekly hours did not always correspond with the daily hours. Reports on weekly hours were obtained from 2,596 women, of whom 12.1 per cent had a week of 48 hours or less, 15 per cent worked over 48 and under 50 hours, 50.5 per cent worked 50 hours, 12.6 per cent worked over 50 and under 52 hours, and 9.6 per cent had a week of 52 and up to and including 54 hours.

## Earnings

THE following table shows the median weekly earnings of all the women reporting (1,530) and of those who had worked a full week (883).

MEDIAN EARNINGS OF ALL WORKERS AND OF FULL-TIME WORKERS, BY INDUSTRY OR OCCUPATION

| Industry or occupation | All workers | Full-time workers |
|---|---|---|
| Manufacturing: | | |
| Automobiles and accessories | $20.10 | $21.30 |
| Other | 14.05 | 14.55 |
| Stores: | | |
| General mercantile | 16.00 | 16.60 |
| 5-and-10-cent | 11.50 | 12.00 |
| Other | 18.40 | 18.55 |
| Laundries | 13.30 | 18.50 |
| Office work | 19.20 | 19.30 |
| Telephone operating | 18.20 | 18.20 |
| Service | 13.75 | 14.00 |
| Total | 16.50 | 16.70 |

The totals in the above table include selling occupations in restaurants and supervisory positions in various industries. "Service" includes elevator operators, cleaners, charwomen, and the like.

In two industries the difference between full-time earnings and earnings that included undertime and overtime work was marked. Laundries had a median for the full-week group of $18.50, while that for all workers was $13.30, a difference of $5.20. In the automobile industry the difference between the two medians was not so great as in laundries, but it was significant nevertheless; the medians were $20.10 for all workers and $21.30 for full-time workers. There was some overtime in both these industries, but as is shown by the earnings not enough to compensate for the time lost. The number of women losing time was high; almost three-quarters (73.3 per cent) of the women in laundries lost some time during the week, as did slightly more than four-fifths (81.2 per cent) of the women in the automobile industry.

## The Workers

FOR 1,784 women who were working at the time of the inquiry or had been working during that year, data were secured regarding age, nativity, and other personal matters. The great majority, 87.4 per

cent, were native-born whites, and of the 216 who were foreign born nearly two-thirds (63.9 per cent) came from English-speaking countries. Of 1,755 who reported on age, 51.6 per cent were under 25 years of age, 36.7 per cent were 25 and under 40, and 11.7 per cent were 40 and over.

In regard to matrimonial status, a rather unusual situation was found. In the course of visits to the home, information was obtained from women who wished to secure outside employment, as well as from those already so employed. Of the 1,738 women gainfully employed, 46.3 per cent were single, 38.7 per cent married, and 15 per cent widowed, divorced, or separated. That is, 53.7 per cent were or had been married. Among the unemployed women who wished to secure work, a little over 72 per cent were or had been married.

Reasons were given by 143 married women as to why they were working or wanted to work. One-half (50.3 per cent) of the women found it necessary to work because the earnings of their husbands were insufficient to support the family. The most general reason why the husband's earnings were insufficient was irregularity of work. This same cause accounted for other reasons for working, such as "to keep up payments on house, as husband's work is too uncertain to do it"; "wife wants work because husband will not start buying a home on his uncertain earnings"; "wouldn't work if husband were sure of steady work, but he never is."

Other women gave as the reason for working a special object such as savings or to pay debts incurred by illness, death, or other unavoidable cause, and 11 women said they worked or would like to, in order to have a little money of their own. The cause last mentioned constituted but a small proportion of the total reasons given.

# CHILD LABOR

## Child Labor in Wisconsin

THE Wisconsin Industrial Commission gives in its periodical, Wisconsin Labor Statistics of March 28, 1929, data concerning child labor in that State. During the year 1928 the total number of work permits issued to children in the State, excluding Milwaukee, was 8,535, of which 3,652 were regular permits, 2,665 were for after-school work, and 2,218 for vacation work. In Milwaukee the number issued was 5,791, of which 3,483 were for regular work. Before a permit is issued proof of age is required, the accepted proofs being, in order, birth certificate, baptismal certificate, record in family Bible, Government records, such as passports, life-insurance policy, and, failing any of these, a physician's certificate as to the physical age of the child with the parents' statement and the school record of age. The campaign for birth registration appears to have been gaining results, for in Milwaukee 50.1 per cent and in the State outside of Milwaukee 46.8 per cent of the work permits were issued upon birth certificates as the proof of age. The percentages issued upon baptismal certificates were, respectively, 45.5 and 47.5, leaving only 4.4 per cent in Milwaukee and 5.7 per cent in the State outside issued upon the less satisfactory proofs.

In Milwaukee all children applying for regular work permits are given a medical examination to determine their fitness for the employment they propose to enter, and to discover any physical or health defects, with a view to having these corrected by follow-up examinations while the children are working. Of the 3,483 examined in 1928, only 246 were free from defects. Of the remainder, much the largest group (2,281) had dental defects, the next largest (470) had some form of throat trouble, 144 suffered from malnutrition, 100 had eyes which needed attention, and in 49 cases the heart was affected. Considerably over one-half—60.4 per cent—of the group having physical defects suffered from two or more of the ills classified.

The responsibility for illegal employment of a minor is placed squarely upon the employer, who is expected to make sure that any child or youth he engages is provided either with a work permit or a certificate of age showing him to be 17 or over. Such certificates are issued by the industrial commission through its appointed agents to minors who reach 17, the proof required being the same as for a work permit. During the year covered 5,436 age certificates were issued, 3,034 being to minors in Milwaukee and 2,402 to those in the State elsewhere.

Wisconsin is one of the States which require increased compensation for industrial injuries received by minors while unlawfully employed. If a child of permit age is injured while employed, without a permit, in an occupation otherwise lawful, double compensation is paid; if he is injured while employed, without a permit, in any place of employment for which permits may not be issued, he is entitled to treble damages, and the same is true of a minor employed in any occupation

forbidden to minors. This provision is intended to act as a deterrent to the unlawful employment of minors, and, consequently, employers are not allowed to insure against the increased liability.

To allow an employer to insure this liability would encourage disregard of the child labor law by many employers, for the reason, if none other, that if liability attached it would, notwithstanding, be borne by the insurance company, and spread the cost of increased compensation among all the employers of the insurance group class.

During the year this increased compensation was incurred in 53 cases, in 33 of which a child had been employed without a work permit, while in 20 the injury had been received in a prohibited employment. The number of cases in which the increased compensation has been claimed and the difference in cost to the responsible employers from 1923 to 1928 is shown, by years, in the following table:

INCREASED COMPENSATION PAID TO MINORS BY EMPLOYERS VIOLATING THE CHILD LABOR LAW, 1923 TO 1928

| Calendar year | Total number of cases | Total amount of normal indemnity | Total amount of increased compensation indemnity incurred | Total indemnity paid |
|---|---|---|---|---|
| 1923 | 69 | $9,782 | $19,640 | $29,422 |
| 1924 | 87 | 15,214 | 30,605 | [1] 55,819 |
| 1925 | 57 | 5,806 | 11,596 | 17,402 |
| 1926 | 66 | 12,839 | 22,434 | 35,273 |
| 1927 | 45 | 11,111 | 16,112 | 27,223 |
| 1928 | 53 | 7,594 | 9,654 | 17,248 |

[1] This is not the total of the items but is as appears in the report.

The purpose of the increased liability, it is explained, is not merely to discourage the unlawful employment of minors, though in this respect it is undoubtedly influential, but also to secure for the child, without contest, substantially as much indemnity as he would have been likely to recover in a suit at common law. "Double and treble compensation liability is deemed approximately equivalent to the usual recoveries at common law."

# HEALTH AND RECREATION

## Work of the Miners' Welfare Fund, 1928

THE British Mines Department has recently issued a report on the condition of the miners' welfare fund and of the work done through it during the year 1928.[1] The income of the fund is from three sources: The output levy, which is a payment of 1 penny per ton of coal produced, imposed on all mining enterprises by the act of 1920; the royalties levy, an annual tax on the rental value of coal mining rights, imposed by an act of 1926; and interest. During 1928 the amount received from the output levy was £973,259,[2] as against £523,504 in 1927, and the receipts from the royalties levy were £161,000.

The fund is administered through a central committee, appointed by the board of trade, and through local or district committees. The acts provide that four-fifths of the amount raised in each district must be spent in that district, and it is left to the central committee to allocate such amounts as seem best to it for such schemes, proposed and worked out by the local committees, as are approved by the central committee. The remaining one-fifth of the amounts raised may be devoted by the central committee to general research and educational or health work without regard to district limitations. The money turned over to the local committees may take the form of an initial grant to aid in establishing some form of welfare work, which is expected to be self-supporting after the first cost is met, or may be an endowment for some kind of work which can not become financially independent, such as a hospital bed. The following table shows the amount allocated to the district committees during 1928, and its division among the various kinds of work undertaken:

AMOUNTS APPROPRIATED FROM MINERS' WELFARE FUND FOR SPECIFIED PURPOSES

| Purpose | 1922–1927 | 1928 | Total |
|---|---|---|---|
| Recreation: | | | |
| Indoor—Institutes, halls, clubs, libraries, swimming baths, etc. | £1,748,986 | £173,729 | £1,922,715 |
| Outdoor—Recreation and sports grounds, playing fields, swimming pools, etc. | 1,361,990 | 225,439 | 1,587,429 |
| Total | 3,110,976 | 399,168 | 3,510,144 |
| Pit welfare: | | | |
| Cycle sheds, canteens, etc. | 11,929 | 1,451 | 13,380 |
| Pit-head baths | 138,835 | 11,622 | 150,457 |
| Total | 150,764 | 13,073 | 163,837 |
| Health: | | | |
| Hospitals, etc. | 157,770 | 33,534 | 191,304 |
| Convalescent schemes | 1,521,199 | 33,255 | 1,554,454 |
| District nursing services | 33,866 | 6,100 | 39,966 |
| Ambulance services | 61,715 | 4,361 | 66,076 |
| Total | 1,774,550 | 77,250 | 1,851,800 |
| Education: Lectures, scholarships, etc. | 52,226 | 4,226 | 56,452 |
| Expenses of administration | 52,966 | 11,184 | 64,150 |
| Grand total | 5,141,482 | 504,901 | 5,646,383 |

[1] Great Britain. Mines Department. Seventh report of Miners' Welfare Fund Committee, 1928. London, 1929.

[2] Pound at par=$4.8665; exchange rate for 1928 was about par.

Appropriations for pit welfare were used for providing cycle sheds, canteens, drying rooms, and shelters at the mine shaft. Funds appropriated for hospitals were devoted to structural additions, equipment, and endowments of existing public institutions. The convalescent schemes included new institutions for the use of miners only, and funds for the purchase of admission tickets to other institutions, the provision of surgical appliances, special treatment of serious accidents, and the like. The appropriations for education covered provision of lectures, scholarships, establishment and equipment of centers for junior technical instruction, etc.

### Pit-head Baths

As IN former years the district allocations were largely spent in schemes for health and recreation, which have been described at some length in earlier reports. (See Labor Review, August 1926, p. 1; January, 1928, p. 58.) In the way of new work, pit-head baths took the leading place. In addition to the amounts shown in the above table as devoted by the districts to this purpose, an appropriation of £177,089 was made during the year from the special fund for pit-head baths. By the close of the year, two experimental installations had been completely finished, and negotiations were under way for pit-head baths at 60 collieries, in 33 of which the preliminary plans and estimates had been approved and 10 were under way. All of these have ample lavatory accommodation, a first-aid room, an attendant's room, equipment for boot cleaning and greasing, a supply of drinking water, and arrangements for the treatment of bath and soil wastes. Where necessary, arrangements are made for softening or filtering the water.

The bath-cubicle section is the most expensive section of the installation, and much consideration has been given to the question of its size.

Its size depends primarily on the maximum number of men likely to be in the building during any given period, and is accordingly influenced mainly by the size of the largest shift and the length of the winding time. For instance, a single-shift colliery with a short winding time requires a very much larger proportion of cubicles for the same total accommodation than one which has multiple shifts and a long winding time. The number of cubicles is so fixed that, provided the men do not spend an unreasonable time under the shower, there is no need for any waiting. It was originally supposed that a man would occupy a cubicle for about seven and a half minutes; this meant that the number of cubicles would be one-eighth of the maximum rate per hour at which the men entered the bathhouse. But it has been found at Pooley Hall that the average time spent in the cubicles is, in fact, only five and a half minutes, and it appears therefore that the number of cubicles may safely be reduced to one-tenth of the rate of arrival.

Next in importance to the bath-cubicle section is the locker room, where the men's wet clothes may be left to dry and be ready for the next day's work, and where the ordinary clothes, which have been left there during working hours, are ready for the men after their baths. The committee has found that the best arrangement is to place the lockers in double tiers, since this economizes on floor space. In some cases, canteens have been installed in connection with the baths, and also covered ways from the mine shaft, but these are not charged to the bath fund. Where canteens are in operation it is found that, even with the moderate prices charged, they make enough not

only to pay their own way, but to leave a surplus toward the upkeep of the baths.

The installations for which contracts were let during 1928 were to accommodate in all 15,140 men, and the average cost per head, including all extras except those which do not fall upon the baths fund, was £10 18s. The cost of upkeep varies with the number of men using the baths. It is expected to be met by local contributions, a fact which makes some of the districts doubtful about accepting an installation of pit-head baths, but wherever baths have been provided it is found that they are soon used to their capacity. This popularity is likely to increase, the committee think, as the effect of these establishments on the family life is realized.

The womenfolk will doubtless have a good deal to say in the matter, for they will be quick enough to appreciate the advantages of not having every day to heat water for one or more persons, of not having to dry the pit clothes in readiness for the next day's work, and most of all of not having continually to be cleaning up the dirt that should have been left at the pit. The cash value alone of such benefits may well exceed the amount of the weekly contribution for the upkeep of the baths.

### Miner's Scholarships

As a part of its educational work, the managing body has provided two classes of scholarships—class A, for working miners, and class B, for the children of miners, designed to give promising candidates a chance for university work. A candidate must be at least 17, and must give proof of an amount of preparation which will enable him to matriculate for the kind of course desired. In 1928 the applications received numbered 625, of which 213 were class A and 412 class B.

After the usual careful scrutiny and comparison of qualifications, six candidates were awarded class A scholarships. The successful competitors ranged in age from 22 to 36, two having reached the latter age and the others being under 25. Four had been underground workers, one was an assistant surveyor and one a repairer. The purposes for which they wished to carry on their education varied, 1 desiring to devote himself to literary work, 2 to scientific research or reorganization in the mining industry, and 3 to adult education.

Five awards were made in the B class, four of them to girls. The ages of the winners ranged from 18 to 21. The boy was given a scholarship to study for an honors degree in mathematics. Of the girls, 2 were given the award to carry on studies in medicine, 1 to study for an honors degree in English, and 1 for an honors degree in mathematics.

## Discussion of Use of Leisure at the Canadian Council of Education

THE more advantageous utilization of leisure was the keynote of the discussions at the Fourth Triennial Conference of the Canadian National Council of Education which opened the first week of April, 1929, at Victoria, British Columbia, and adjourned a few days later to Vancouver.[1] In addition to the Canadian delegates and visitors there were representatives of nine other countries at these meetings.

[1] Christian Science Monitor, Boston, Apr. 6, 8–13, 1929.

Referring to the reports from abroad on recreation activities, which were an interesting feature of the proceedings, one of the speakers reminded the delegates that the conference had to deal with the leisure of the Canadian people who, he declared, "are doers and not thinkers, empire builders not dreamers, farmers not artists."

Among the outstanding topics taken up by the conference were organized games, physical education, control of radio, the improvement of moving pictures, the right use of leisure for the production and enjoyment of good literature, support for Canadian literature, and the contemplation of spiritual things, the last-mentioned means of education being emphasized by Tagore, the Indian poet, who also declared that "the spirit of progress occupies a great deal more of our mind to-day than the deeper life-process of our being which requires leisure for its sustenance."

# CARE OF THE AGED

## Meeting of American Association for Old-Age Security

THE second national conference of this association was held in New York City, April 26, 1929, with two sessions during the day and a dinner and addresses in the evening. The program included a number of well-known speakers and there was free discussion from the floor. The points especially stressed were the inability of the average worker to make sufficient provision for his own old age, the social unrest arising from the resultant sense of insecurity, the inadequacy and unsatisfactory character of private industrial pension plans, and the growing interest and support behind the old-age pension movement throughout the country.

In connection with the difficulty the average worker finds in providing for his old age, emphasis was laid on the age limit in employment. Speaker after speaker called attention to the fact that at a time when the average expectation of life has been increased, the working period is being sharply limited by the unwillingness of employers to take on a man of 45 or over—some speakers put the age even lower—who finds himself out of a job. Theodore L. Bierck, chairman of the New Jersey Commission on Old Age Insurance and Pensions, dwelt on the connection between this situation and the crime wave. He held that the threat of economic insecurity is a main contributing cause of the crime wave. To-day a man of forty-odd years, capable and in full health, is not wanted for employment. What is the thought in that man's head? What is his future? The increase of criminals is receiving recruits from those who are desperate. It is all well and good to respect law, but we must have respectable laws. We who are fortunate must have regard for those who are less fortunate. The State by law should in its sovereign right decree that those who have reached an age when their labor is impossible shall be cared for.

Mr. Murray W. Lattimer, of the Industrial Relations Counselors, discussed the pension plans maintained by private employers, trade-unions, and other nonpublic organizations. The majority, he concluded, are not on a sound financial basis. The systems maintained by industrial organizations are unsatisfactory, since the employer has a right to impose and change the conditions for securing pensions as he pleases. They can be used as a means of tying the worker to his job and preventing his effective protest against undesirable employment conditions, and very few of them give the worker any contractual rights, no matter how faithfully he observes his side of the plan. As for the trade-unions, their plans, which at present cover about 11,500 employees, are, he stated, in quite as precarious a situation financially as the schemes of the industrial employers. Technically, most of the plans in both groups are in a state of bank-

ruptcy, since they are merely meeting present needs and not making adequate provision for the steadily increasing pension demands of the future. At best they cover only a fraction of the industrial army, and there is little indication, he thought, that their coverage would increase to any great extent.

Mr. Elmer Spahr, president of the Pennsylvania Conference of Bricklayers, pointed out as another defect of the private systems their failure to provide for workers who, like those of his craft, were seldom long in the employ of any one company. A contractor employs the bricklayers he needs for a particular job, and when that job is finished lets them go. A bricklayer may work for three, four, or more contractors in a single season; how can he fulfill the conditions of continuous employment usually imposed in any pension plan?

Miss Frances Perkins, commissioner of labor for New York, emphasized the same point. Speaking of the industrial pension plans discussed in a recent report of the Pennsylvania Commission on Old Age Pensions, she said that in most of the plans studied the minimum length of service demanded before the worker becomes eligible for a pension is from 20 to 25 years. In view of the fact that there are authoritative statistics which show that only about 4 per cent of the male workers in industry remain with the same employer for 20 years or over, and only less than 3 per cent of the woman workers stay that long on one job, it is difficult to see how the total number of workers who can qualify for industrial pensions under rules of this sort can grow to such proportions as will serve to reduce materially the great army of indigent aged in this country.

Rabbi Edward L. Israel, of Baltimore, speaking on the challenge of old age, pointed out that the United States has not kept up with other countries in providing for its dependent aged. Much of the present unrest, he held, is due to the slight hold workers have on their jobs, and this condition is aggravated by the changing industrial demands. While medical science has added a few years to life, industry, by shortening the years of labor, has brought old age nearer to the working masses. The pensions of the individual corporations will not solve this problem any more than the company union solved the problem of labor. The time must come when society will reward its heroes of peace and progress as it does now its war heroes.

Dr. Eveline M. Burns, of Columbia University, gave a brief review of the English old-age pension system, stating that approximately 1,750,000 persons in Great Britain are now receiving some form of pension after reaching old age. That the system has commended itself to the people as a whole appears from the fact that at a time when the most rigid economy is being exercised in health and social welfare work, and even army and navy appropriations are being pruned to the limit, the old-age pension acts have not only been retained uncut, but their scope has been enlarged and their maintenance is no longer a political question. The question at issue between the political parties is no longer whether or not pensions are socially desirable but merely how far they should be extended, and whether the additional sums should be raised by general taxation or by contributions from employers and workers.

Mr. Thomas Kennedy, of the United Mine Workers of America, told of the fight his organization had been making to secure State legislation for the aged in Pennsylvania. Dr. Royal Meeker, formerly United States Commissioner of Labor Statistics, spoke on the place of old-age and invalidity benefits in a system of social insurance, pointing out the extravagance and inadequacy of our present treatment of old-age dependency, and of the need for a comprehensive system covering the poverty arising from unemployment and illness, as well as from old age. Even on financial grounds alone, better provision for the aged would be justified. The cost of an adequate old-age pension plan can not be compared with the present cost, since the real burdens of old-age dependency are borne by countless persons and can not possibly be estimated. Neither can these costs be measured in dollars and cents. If the aged were taken care of systematically the cost would not be greater than now, but the results would be highly more satisfactory than under the present inadequate system.

Rabbi Stephen S. Wise made a strong appeal for better care of the aged on ethical grounds. Citing the "hundred neediest cases" for which a New York paper seeks special contributions at each Christmastide, he pointed out in how many cases the need is caused by the infirmity of age, and asked why their wants should be supplied only once a year. Why should people grown old be dealt with as beggars because they are without means of subsistence? No fairly civilized society would dream of penalizing old age as we do. To be subjected to the indignity of partial, temporary, and pitifully inadequate aid, except during the Christmas season, is a cruel wrong to people whose only sin is that they were not able to accumulate a competence.

A number of others spoke on various aspects of the question, and Mr. Abraham Epstein, the secretary of the association, gave a résumé of the progress of the movement during the year just completed, reporting encouraging progress.

Several telegrams were read from those who had been invited but found themselves unable to attend. One from Senator C. C. Dill, of Washington, announced his willingness to help the aims of the association by introducing a bill for a national system of old-age pensions into the Senate, and by working for its passage. Secretary Davis, of the Department of Labor, telegraphed his cordial good wishes, and urged the special need for a pension system at this time when new machines and new methods are daily displacing workers—nearly always the older employees—so that the automatic processes of life tend to increase constantly the thousands of those caught in later years without the means of even a meager existence.

We can not safely tolerate these conditions. It is nothing but good business to halt this process which tends to create a permanent class of the unemployed and helpless. If we do not grapple with this growing condition, it will, in the end, turn and tear our prosperity to pieces.

## Old-Age Pensions in South Africa

IN THE first half of 1928 the Union of South Africa passed legislation establishing an old-age pension system, to come into operation January 1, 1929. (See Labor Review, September, 1928, p. 101.) The South African Social and Industrial Review, in its issue for March, 1929, states that in reply to a question in the legislative assembly the Minister of Finance gave some data concerning applications for benefit under the system. Up to December 31, 1928, applications to the number of 24,884 had been granted, of which 14,980 were in the Cape, 1,285 in Natal, 2,751 in the Free State, and 5,868 in the Transvaal. The total annual liability incurred up to the end of December was £662,077.[1]

[1] Pound at par = $4.8665; exchange rate for 1928 was about par.

# INDUSTRIAL ACCIDENTS

## Standard Safety Codes Should be Written into Agreements and Contracts

By Ethelbert Stewart, United States Commissioner of Labor Statistics

AS IS well known, the responsibility for accidents in all industries is charged to the employers by the employees and to the employees by the employers. "Carelessness" is the one word that covers all causes of accidents when the employer is talking. "Speeding up and utter absence of safety facilities, utter neglect of common safety equipment," is the one answer when workmen are talking.

To those of us who view the matter entirely from the outside and who are really trying to prevent industrial accidents, the amount of truth, if any, in either one of these stand-pat positions is very difficult to ascertain. When the employer says you can not write into a safety code protection against the human element in accident causation, we who view the matter from a purely disinterested point of view know there is just as much human element on the employers' side as on the workers' side. No doubt ignorance of what constitutes safety is a major element in industrial accidents in the case not only of a vast majority of the contractors, particularly the smaller ones, but also of the workers. Carelessness is equally divided. It is all right to say that no contractor wants to hurt his men physically, but it is just as apparent to outside observers that no workman wants to get hurt. The real effect of all the charges and countercharges is to delay constructive accident prevention.

It is here proposed that the recognized national or local safety codes, where there are such, be written into every collective wage agreement as a part of the wage contract. Where there is no national or local safety code, then a safety code which shall be agreed upon between the employer or employers' association and the employees or the employees' associations shall be developed and written into the contract.

This accomplished, the plea of ignorance can not be made. "Carelessness" becomes a direct violation of the contract and can be handled as such.

This is just as applicable to company-union agreements as it is to trade-union agreements; and where there is no agreement at all, the courts would probably for the most part hold that such agreements written into trade-union and company-union agreements were indicative of the established custom of the industry and were binding upon employers and workmen whether or not there was any agreement.

In the building trades, where apparently a few individuals, through tactics that need not be here described, have been able to prevent any agreement as to what shall constitute a building safety code, the matter can be controlled through the architects. The architects' association has a safety code, probably the most perfect one

for the construction industry in existence. Why it is kept locked up in their offices it is extremely difficult for a man on the outside to understand. But this Middle Ages attitude of secrecy may be overcome—in fact it seems to be gradually being overcome.

Once this is done the architect, who after all is the man who writes the contract between the builder and the owner, can write the safety code into the contract as an integral part thereof. And while this does not immediately connect the building contractor up with his workmen, it does give the owner who does not care to have his home or his office building erected at the expense either of making widows or of breaking men's arms and legs a direct means of attack upon the careless contractor through the contract. Perhaps nothing would so quickly form a foundation for intelligent action on the part of the contractors.

This method would likewise answer the objection which the building contractors make to a national code, which is that these codes would immediately be written into the statutes of the various States and made a part of the building inspection, which would be administered by trade-unionist appointees of governors who were catering to the labor vote. This charge, which some of us have heard for 50 years, does not seem worthy of answer at this time. However, it would not be necessary for legislatures to pass building safety codes if such codes were written into every contract and could be handled by the courts direct.

One objection—and every man who does not want to pay attention to safety methods will find some objection—is that many of these safety codes are so long that it would be a serious inconvenience to write them into agreements and that this would be particularly true of individual building contracts. The answer to that is that a fairly large percentage of these safety codes can be secured from the Government free of cost and that the contract itself need only refer to them as, for instance, that Bulletin No. 436, Safety Code for the Use, Care, and Protection of Abrasive Wheels, published by the United States Bureau of Labor Statistics, be made in whole and in detail a part of the contract.

It would be infinitely cheaper for the State to print and issue free a sufficient number of copies of any code, to be made a part of individual contracts, than it would be to enact a State law with the attendant legislative expense. It would be cheaper for the insurance companies and the monopolistic State fund compensation States to issue these codes in sufficient numbers than it would be to pay the compensation cost of accidents. Besides, some of us are getting tired of the question of cheapness when it comes to unnecessary killing and maiming of human beings.

Once the writing of safety codes into collective agreements and building contracts becomes a common practice, the courts will gradually drift into an attitude that where this is neglected such neglect is deliberate, and the parties guilty of such neglect, whether they are associations of employers or national or local trade-unions, establishments, or company unions, or what not, are on the face of things unusually and culpably negligent as to the common prevailing safety practices.

As a further step in this direction, if the insurance companies could be induced to write the safety code into the policy issued to every contractor, with the understanding that any flagrant violations of that code or any deliberate ignoring of the code would forfeit the policy, much of the convenient ignorance as to safety methods and safety practices would soon disappear.

If every agency forming contacts with employers or workers would make reasonable safety codes an essence of that contract—in other words, if everyone would *do* as well as they *know* and really make "safety first" mean something, first in the labor agreement, first in the contract, first in everything—some of us might live to see industrial accidents practically eliminated.

## Accidents on Steam Railways in the United States, 1928

A PRELIMINARY report of accidents on steam railroads in the United States for the calendar year 1928 has just been issued by the Interstate Commerce Commission. Although admittedly subject to revision, it is probable that the revised figures will not be available for some time and that they will not differ materially from this early report, and a summary thereof is therefore believed to be justified at this time.

The table following gives the details. It will be noted that the record for 1928 was lower than that for 1927 except in the number of passengers killed and the number of those killed in the "Other non-trespassers" classification. In the former instance the increase was 3.66 per cent. The number of employees injured decreased 20.41 per cent. The total decrease in the number killed was 4.57 per cent and in the number injured 18.36 per cent.

Highway grade-crossing accidents continue to take their terrible toll. In 1928 there were 5,800 such accidents, exceeding the 1927 mark by 160 or 2.8 per cent. In these accidents 2,568 persons were killed in 1928 and 2,371 in 1927, while 6,667 were injured in the former year, as compared with 6,613 in 1927. In other words, in both years the ratio of killed to injured was slightly less than 1 to 3. This ratio is interesting because in no other field of industry is it so high. The bureau's 1927 data of accidents in structural-iron work which is recognized as one of the most hazardous industrial pursuits, shows for 71 establishments employing 11,900 full-year workers in 17 States, a total of 1,401 nonfatal injuries and 27 fatalities.[1] This is a ratio of only 1 to 52—too high, but comparatively insignificant. It should be stated, however, that in train-service accidents, appearing in the table, the classification "Struck or run over, not at public crossings," shows a much higher ratio of killed to injured. In this group of accidents, in 1928, 2,253 persons were killed and 1,639 were injured, indicating a ratio of about 1 to 0.72, or 7 killed to 5 injured.

Accident rates per million man-hours, among employees only, which may be fairly compared to rates in manufacturing industries, as published by this bureau,[1] are shown in the table to be 0.30 for fatalities and 16.62 for injuries in 1928 and 0.34 for fatalities and 19.87 for injuries in 1927.

[1] See Labor Review for March, 1928, p. 87.

NUMBER OF KILLED AND INJURED IN ACCIDENTS ON STEAM RAILROADS, 1928

| Kind of accident | Year | Number of accidents | Employees | | Passengers | | Other nontrespassers | | Trespassers | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Killed | Injured | Killed | Injured | Killed | Injured | Killed | Injured | Killed | Injured |
| *Train accidents* | | | | | | | | | | | | |
| Collisions | 1927 | 4,803 | 65 | 547 | 6 | 897 | 7 | 108 | 2 | 5 | 80 | 1,557 |
| | 1928 | 4,302 | 51 | 497 | 8 | 577 | 9 | 111 | 2 | 7 | 70 | 1,192 |
| Derailments | 1927 | 11,370 | 82 | 513 | 4 | 589 | 11 | 104 | 25 | 65 | 122 | 1,271 |
| | 1928 | 9,938 | 66 | 534 | 8 | 784 | 32 | 140 | 23 | 38 | 129 | 1,496 |
| Locomotive-boiler accidents | 1927 | 22 | 25 | 21 | ----- | ----- | ----- | ----- | ----- | ----- | 25 | 21 |
| | 1928 | 25 | 10 | 20 | ----- | ----- | ----- | ----- | ----- | ----- | 10 | 20 |
| Other locomotive accidents | 1927 | 664 | ----- | 13 | ----- | ----- | ----- | 1 | ----- | ----- | ----- | 14 |
| | 1928 | 552 | ----- | 3 | ----- | 3 | ----- | 1 | ----- | 1 | ----- | 8 |
| Miscellaneous | 1927 | 2,117 | 22 | 117 | ----- | 25 | 35 | 65 | 2 | 2 | 59 | 209 |
| | 1928 | 2,132 | 11 | 72 | ----- | 40 | 52 | 44 | ----- | 1 | 63 | 157 |
| Total, train accidents | 1927 | 18,976 | 194 | 1,211 | 10 | 1,511 | 53 | 278 | 29 | 72 | 286 | 3,072 |
| | 1928 | 16,949 | 138 | 1,126 | 16 | 1,404 | 93 | 296 | 25 | 47 | 272 | 2,873 |
| *Train-service accidents* | | | | | | | | | | | | |
| Coupling or uncoupling cars or locomotives. | 1927 | ----- | 48 | 1,325 | ----- | ----- | ----- | ----- | ----- | ----- | 48 | 1,325 |
| | 1928 | ----- | 37 | 1,135 | ----- | ----- | ----- | ----- | ----- | ----- | 37 | 1,135 |
| Coupling or uncoupling air hose | 1927 | ----- | 21 | 398 | ----- | ----- | ----- | ----- | ----- | ----- | 21 | 398 |
| | 1928 | ----- | 28 | 354 | ----- | ----- | ----- | ----- | ----- | ----- | 28 | 354 |
| Operating locomotives | 1927 | ----- | 22 | 4,467 | ----- | ----- | ----- | ----- | ----- | ----- | 22 | 4,467 |
| | 1928 | ----- | 13 | 3,402 | ----- | ----- | ----- | ----- | ----- | ----- | 13 | 3,402 |
| Operating hand brakes | 1927 | ----- | 32 | 2,158 | ----- | ----- | ----- | ----- | ----- | ----- | 32 | 2,158 |
| | 1928 | ----- | 25 | 1,836 | ----- | ----- | ----- | ----- | ----- | ----- | 25 | 1,836 |
| Operating switches | 1927 | ----- | 1 | 802 | ----- | ----- | ----- | ----- | ----- | ----- | 1 | 802 |
| | 1928 | ----- | 1 | 684 | ----- | ----- | ----- | ----- | ----- | ----- | 1 | 684 |
| Coming in contact with fixed structures. | 1927 | ----- | 47 | 590 | ----- | 3 | 2 | 1 | 22 | 31 | 71 | 625 |
| | 1928 | ----- | 37 | 493 | ----- | 2 | ----- | 2 | 8 | 24 | 45 | 521 |
| Getting on or off cars or locomotives.[1] | 1927 | ----- | 68 | 5,665 | 34 | 1,102 | 8 | 124 | 318 | 919 | 428 | 7,810 |
| | 1928 | ----- | 39 | 4,860 | 35 | 957 | 9 | 116 | 285 | 796 | 368 | 6,729 |
| Highway grade crossings | 1927 | ----- | 27 | 89 | ----- | 7 | 2,192 | 6,246 | 109 | 140 | 2,328 | 6,482 |
| | 1928 | ----- | 34 | 92 | ----- | 5 | 2,370 | 6,356 | 92 | 120 | 2,496 | 6,573 |
| Struck or run over, not at public crossings.[1] | 1927 | ----- | 400 | 629 | 21 | 51 | 253 | 362 | 1,813 | 917 | 2,487 | 1,959 |
| | 1928 | ----- | 359 | 461 | 22 | 54 | 248 | 348 | 1,624 | 776 | 2,253 | 1,639 |
| Miscellaneous | 1927 | ----- | 306 | 10,592 | 14 | 1,212 | 49 | 1,065 | 289 | 636 | 658 | 13,505 |
| | 1928 | ----- | 251 | 9,148 | 10 | 1,037 | 43 | 857 | 302 | 599 | 606 | 11,641 |
| Total, train-service accidents | 1927 | ----- | 972 | 26,715 | 69 | 2,375 | 2,504 | 7,798 | 2,551 | 2,643 | 6,096 | 39,531 |
| | 1928 | ----- | 824 | 22,465 | 67 | 2,055 | 2,670 | 7,679 | 2,311 | 2,315 | 5,872 | 34,514 |
| Total train and train-service accidents. | 1927 | ----- | 1,166 | 27,926 | 79 | 3,886 | 2,557 | 8,076 | 2,580 | 2,715 | 6,382 | 42,603 |
| | 1928 | ----- | 962 | 23,591 | 83 | 3,459 | 2,763 | 7,975 | 2,336 | 2,362 | 6,144 | 37,387 |
| Total nontrain (including industrial) accidents. | 1927 | ----- | 324 | 59,642 | 3 | 674 | 38 | 1,599 | 74 | 281 | 439 | 62,196 |
| | 1928 | ----- | 281 | 46,101 | 2 | 568 | 39 | 1,231 | 43 | 274 | 365 | 48,174 |
| Grand total, all accidents | 1927 | ----- | 1,490 | 87,568 | 82 | 4,560 | 2,595 | 9,675 | 2,654 | 2,996 | 6,821 | 104,799 |
| | 1928 | ----- | 1,243 | 69,692 | 85 | 4,027 | 2,802 | 9,206 | 2,379 | 2,636 | 6,509 | 85,561 |
| Highway grade-crossing accidents. | 1927 | ----- | 30 | 106 | ----- | 34 | 2,232 | 6,333 | 109 | 140 | 2,371 | 6,613 |
| | 1928 | ----- | 37 | 107 | ----- | 11 | 2,439 | 6,429 | 92 | 120 | 2,568 | 6,667 |
| Per cent of decrease in total accidents, 1927 to 1928 | ----- | ----- | 16.58 | 20.41 | [2] 3.66 | 11.69 | [2] 7.98 | 4.85 | 10.36 | 12.02 | 4.57 | 18.36 |
| Accident rate (train and train service) per million locomotive miles. | 1927 | ----- | .67 | 16.05 | .05 | 2.23 | 1.47 | 4.64 | 1.48 | 1.56 | 3.67 | 24.48 |
| | 1928 | ----- | .57 | 13.87 | .05 | 2.03 | 1.62 | 4.69 | 1.37 | 1.39 | 3.61 | 21.98 |
| Accident rate per million man-hours. | 1927 | ----- | .34 | 19.87 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| | 1928 | ----- | .30 | 16.62 | ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |

[1] Excludes all cases of suicide or attempted suicide.

[2] Increase.

## Accident Experience of Norfolk & Western Railway Co., 1928

THE Norfolk & Western Railway Co., which, beginning with 1913, has been carrying out a definite safety program affecting its employees, has recently submitted its accident record for public inspection with the comment that "every officer and employee alike

should be proud of it because it represents the saving of human life and limb and prevention of suffering and distress." The company expresses the opinion that "our railroad will be yet safer in future years if officers and employees continue their earnest efforts to make it so."

The accident record for the year 1912 is used as the basis of comparison with subsequent years, since 1912 was the year prior to the establishment of the safety committee system. In that year 61 employees were killed and 2,675 were injured, with rates per billion ton-miles of 6.76 and 296.52, respectively.

In 1928 there were 12 employees killed (a reduction of 80 per cent) and 643 injured (a reduction of 76 per cent), giving a fatality rate of 0.76 per billion ton-miles and an injury rate of 40.84. These rates show reductions of about 89 and 86 per cent, respectively. Corresponding frequency rates per million man-hours, as computed from the report are 0.19 and 12.86, respectively.

The following table gives the details:

TABLE 1.—ACCIDENT EXPERIENCE OF NORFOLK & WESTERN RAILWAY CO. FOR SPECIFIED YEARS, 1912 TO 1928

| Year | Volume of business, tons 1 mile | Employees killed | Employees injured | Fatality rate per billion ton-miles | Injury rate per billion ton-miles |
|---|---|---|---|---|---|
| 1912 | 9,021,204,776 | 61 | 2,675 | 6.76 | 296.52 |
| 1915 | 11,022,466,620 | 36 | 1,831 | 3.27 | 166.11 |
| 1920 | 11,659,836,023 | 34 | 1,632 | 2.92 | 139.96 |
| 1925 | 14,493,093,806 | 24 | 1,678 | 1.66 | 115.78 |
| 1927 | 15,801,527,554 | 21 | 1,209 | 1.33 | 76.51 |
| 1928 | 15,742,477,664 | 12 | 643 | .76 | 40.84 |

The following table presents the record for each operating division, with frequency rates per million man-hours. The frequency rates have been computed from the data presented, as the published table does not contain them.

TABLE 2.—ACCIDENT EXPERIENCE OF NORFOLK & WESTERN RAILWAY CO. FOR 1928, BY OPERATING DIVISIONS

| Operating division | Killed | Injured | Total | Total man-hours | Man-hours per injury | Frequency rate per million man-hours | |
|---|---|---|---|---|---|---|---|
| | | | | | | Killed | Injured |
| Pocahontas | 0 | 65 | 65 | 6,897,570 | 106,116 | ..... | 9.42 |
| Radford | 1 | 55 | 56 | 4,456,807 | 79,586 | 0.22 | 12.34 |
| Norfolk | 1 | 64 | 65 | 5,130,575 | 78,932 | .19 | 12.47 |
| Shenandoah | 1 | 53 | 54 | 3,792,239 | 70,227 | .26 | 14.24 |
| Scioto | 2 | 110 | 112 | 6,710,642 | 59,916 | .30 | 16.39 |
| Total, 1928 | 5 | 347 | 352 | 26,987,833 | 76,670 | .19 | 12.86 |
| Total, 1927 | 7 | 584 | 591 | 32,243,485 | 54,558 | .22 | 18.11 |

## Industrial Accidents in Pennsylvania in 1928

A STATISTICAL summary of industrial accidents in Pennsylvania during the calendar year 1928 and for the 5-year period ending with 1928 appears in the February, 1929, issue of Labor and Industry, the monthly publication of the State Department of Labor and Industry. The record for 1928 is presented by industry and

by cause, showing fatal and nonfatal accidents, but with no distribution of the nonfatal cases by nature of injury.

In 1928 there were 2,080 fatal cases and 150,433 nonfatal cases, the latter being lower by 8,257 than in 1927, the next lowest record during the 5-year period. The number of fatal accidents was lower in 1925 and 1927 than in 1928 by 71 and 27, respectively. It is noted that the reduction in accidents was quite consistent, only two months—May and October—exceeding the records for the corresponding months in 1927. The total accident record for 1927 was 10.9 per cent lower than that for 1926 and the total for 1928 was 5.1 per cent lower than that for 1927. This is partly due, it is pointed out, to reduced exposure to accidents on account of decreased employment, but it is believed that safety and accident prevention work was largely instrumental in effecting the reduction, "especially in 1928 when, as it is generally agreed, the pay-roll exposure to accident was at least equal to that in 1927. If this be true, then the 5.1 per cent reduction in accidents for 1928 is a real safety accomplishment."

The increase over the preceding year of 27 in the number of fatalities is due principally to one mine disaster in which 194 lives were lost. Had this not occurred the fatal accident record would show a reduction from 1927 of 8.1 per cent.

The following table presents the data by industry and by major cause group:

INDUSTRIAL ACCIDENTS IN PENNSYLVANIA IN 1928, BY INDUSTRY AND PRINCIPAL CAUSE GROUPS

| Industry | Working machinery and processes | | Handling objects by hand | | Hand tools | | Falling objects | | Falls of persons | | Total [1] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fatal | Nonfatal | Fatal | Nonfatal | Fatal | Nonfatal | Fatal | Nonfatal | Fatal | Nonfatal | Fatal | Nonfatal |
| Construction and contracting | 5 | 599 | 5 | 4,145 | 1 | 1,798 | 25 | 1,889 | 87 | 3,815 | 227 | 18,355 |
| Coal mining: | | | | | | | | | | | | |
| Anthracite | 4 | 442 | 8 | 4,940 | 1 | 2,860 | 261 | 7,230 | 17 | 2,555 | 474 | 25,417 |
| Bituminous | 11 | 1,061 | 2 | 3,090 | 2 | 2,566 | 185 | 6,883 | 3 | 1,376 | 544 | 22,580 |
| Quarrying and mining other than coal mining | ---- | 84 | ---- | 606 | ---- | 326 | 11 | 443 | 4 | 240 | 32 | 2,295 |
| Transportation and public utilities | 4 | 92 | 5 | 1,848 | 1 | 861 | 2 | 443 | 17 | 1,701 | 213 | 9,441 |
| Other industries [2] | 1 | 1,014 | 14 | 4,583 | 3 | 1,631 | 9 | 977 | 33 | 4,270 | 234 | 19,844 |
| Manufacturing: | | | | | | | | | | | | |
| Chemicals and allied products | 1 | 110 | ---- | 566 | 1 | 228 | 2 | 152 | 4 | 470 | 36 | 2,428 |
| Clay, glass, and stone products | 4 | 299 | ---- | 1,562 | ---- | 260 | 2 | 415 | 3 | 525 | 26 | 4,483 |
| Clothing | ---- | 820 | ---- | 296 | ---- | 160 | ---- | 32 | ---- | 258 | 6 | 1,877 |
| Food and kindred products | 1 | 400 | 3 | 1,292 | ---- | 395 | ---- | 243 | 1 | 916 | 21 | 4,906 |
| Leather, rubber, and composition goods | ---- | 352 | ---- | 356 | ---- | 144 | 1 | 91 | 1 | 226 | 9 | 1,555 |
| Lumber, wood and their products | 3 | 944 | 5 | 872 | 2 | 515 | 8 | 315 | 4 | 434 | 30 | 3,723 |
| Paper, paper products, printing and publishing | 3 | 607 | ---- | 474 | ---- | 129 | ---- | 178 | 2 | 362 | 13 | 2,285 |
| Textiles | 2 | 842 | 1 | 600 | ---- | 149 | ---- | 159 | 2 | 434 | 10 | 2,766 |
| Blast furnaces and steel works | 2 | 25 | 1 | 200 | 1 | 77 | ---- | 104 | 6 | 113 | 31 | 922 |
| Rolling mills | 4 | 783 | 5 | 1,524 | ---- | 405 | 4 | 672 | 10 | 602 | 45 | 5,532 |
| Foundries and machine shops | 3 | 965 | ---- | 1,627 | 1 | 379 | 2 | 532 | ---- | 358 | 17 | 5,584 |
| Fabrication | 16 | 2,258 | 4 | 2,858 | 1 | 904 | 2 | 986 | 7 | 1,046 | 69 | 10,669 |
| Car repair shops | 1 | 214 | 2 | 603 | 1 | 407 | ---- | 223 | 5 | 500 | 25 | 2,813 |
| Automobile service stations | ---- | 94 | ---- | 305 | ---- | 417 | ---- | 57 | 1 | 190 | 10 | 2,128 |
| Other manufacturing | ---- | 272 | ---- | 212 | ---- | 53 | 1 | 21 | 5 | 112 | 8 | 820 |
| Total, manufacturing | 40 | 8,985 | 21 | 13,347 | 7 | 4,622 | 22 | 4,180 | 51 | 6,546 | 356 | 52,501 |
| Grand total | 65 | [3] 12,327 | 55 | 32,559 | 15 | 14,664 | 515 | 22,045 | 212 | 20,503 | 2,080 | 150,433 |

[1] Includes all causes.
[2] Includes hotels and restaurants, wholesale and retail trade, State and municipal, and miscellaneous.
[3] Taken from the report; it is not the sum of the items.

# WORKMEN'S COMPENSATION

## Passage of Workmen's Compensation Act in Saskatchewan

FOLLOWING an order in council, dated March 13, 1928, a royal commission was appointed to inquire into and report upon the subject of workmen's compensation in Saskatchewan. The report, dated December 28, 1928, points out that the existing system was based upon individual liability. This liability of employers to injured employees was based upon two kinds of actions: (*a*) An action under the common law, and (*b*) an action under the workmen's compensation act. (Acts of 1910–11, ch. 9.) The second was in the nature of an employers' liability statute. The report of the commission contained the following recommendations, unanimously agreed to:

1. The enactment of a new workmen's compensation act embodying the abrogation of the present system of compensation to injured workmen and their dependents and the adoption of a collective liability system similar to that of the Province of Ontario save and except as applicable to those railway employees included in the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Firemen and Enginemen, the Order of Railway Conductors, the Brotherhood of Railway Trainmen, the Order of Railway Telegraphers, and Maintenance of Way Employees, all of whom shall retain the present system, subject to the right of each association to withdraw from the present system and come under the proposed system upon a favorable ballot therefor being taken.
2. That the act be administered by an independent board of three commissioners devoting their whole time to its administration, removable only for cause. As the success of the system depends so largely on the personnel of the board, we suggest that personal fitness for the position be the determining feature in making appointments to the board, and the remuneration be sufficient to attract good men.
3. That the new act shall not at present include farm laborers, domestic servants, and outworkers, but provision may be made for inclusion of the two first-named classes at a later date.
4. That the scale of compensation be 66⅔ per cent, but that the monthly allowance to the widow be $50 instead of $40 as in Ontario, otherwise the scale in the Ontario act be followed.
5. That the employees do not contribute to the general fund but that a small monthly deduction may be made in sparsely settled districts, such as lumber, mining, and construction camps, for hospital and medical treatment, subject always to the approval of the board.
6. [That] the proposed act include a clause as the Ontario act (subsection (4) of section 67) to the effect that the decisions of the board shall be upon the real merits and justice of the case and it shall not be bound to follow strict legal precedent.
7. That the decisions of the board be final on all questions.
8. That adequate provision be made in the act for an effective system of accident prevention based on the representation and cooperation of both employers and employees, such system to be under the jurisdiction of the board.
9. That the government of Saskatchewan make an annual grant sufficient to bear the cost of administration for the first few years till the system is well established as was done in the Province of Ontario.

At the 1928–29 session of the Legislative Assembly of Saskatchewan a workmen's compensation act was passed. (Acts of 1928–29, ch. 73.) This act, assented to February 2, 1929, is similar in many respects to the existing Ontario act and follows the recommendations of the royal commission above outlined except that it provides for a monthly allowance of $40 to widows in place of the $50 recommended by the commission. The act, analyzed below, follows the method

used in previous articles and reports by the Bureau of Labor Statistics, permitting an easy comparison with other acts, as well as presenting the substance of the law in convenient form.

*Saskatchewan workmen's compensation act*

*Date of enactment.*—February 2, 1929; in effect on a date or dates to be determined by proclamation of the lieutenant governor.

*Injuries compensated.*—Injuries by accident arising out of and in the course of the employment which cause death or disability of the employee for at least seven days, those due to serious or willful misconduct excepted, unless resulting in death or serious disablement. Compensation is payable from the date of disability. Enumerated industrial diseases included.

*Industries covered.*—Extensive list; includes manufacturing, construction, lumbering, mining, quarrying, transportation, operation of public utilities, etc. Farm labor, domestic service, outworkers, and casual employment are excluded.

*Persons compensated.*—Private employment: All employees in industries covered other than outworkers and those whose employment is casual, and not for the purpose of the employer's trade or business, but members of certain railroad labor organizations shall not be covered until such organizations shall elect to be covered. Public employment: Included in so far as employments would be covered if under private employers.

*Compensation for death:*

(*a*) Necessary burial expenses, not exceeding $125.

(*b*) To a widow or invalid widower, $40 per month, $10 additional for each child under 16 years; orphans, $15 per month each.

(*c*) To other dependents, an amount proportionate to the pecuniary loss, for such time as support might be reasonably expected.

(*d*) If no dependents, reasonable allowance is to be made for medical attendance, care, maintenance, and burial.

The aggregate compensation, except for burial expenses, may not exceed 66⅔ per cent of the monthly wages of the deceased.

Payments to children cease at 16 unless invalid, and to widow on remarriage, when she receives two years' benefits.

*Compensation for disability:*

(*a*) Necessary medical and surgical aid, with transportation to hospital or home if needed.

(*b*) For total disability 66⅔ per cent of the average weekly earnings, during disability, not less than $12.50 per week, unless earnings are less, then full earnings.

(*c*) For partial disability, 66⅔ per cent of the weekly wage loss, payable during the continuance of such disability.

Periodical payments may be commuted to a lump sum after six months, or earlier with the consent of the workman and the approval of the board.

In computing compensation no earnings in excess of $2,000 are to be considered in any case.

*Revision of compensation.*—Awards may be reviewed on the motion of either party in interest; also on the board's own motion if payments are being made from the accident fund.

*Insurance.*—Payments under the main schedule are made from an accident fund compulsorily maintained by employers under Schedule I of the act. Board may require employers under Schedule II to insure in an approved company.

*Security of payments.*—State board administers the accident fund and is required to maintain a reserve. Payments are exempt from assignment, attachment, or set-off, except with the approval of the board; nor may they pass by operation of law to other than to a personal representative. Waivers are forbidden.

*Settlement of disputes.*—All disputes are to be settled by the board. Suits at law are forbidden. The decisions of the board upon questions of law and fact are final and conclusive.

## Recent Workmen's Compensation Reports

### Idaho

THE sixth report of the Industrial Accident Board of the State of Idaho, covering the biennial period from November 1, 1926, to October 31, 1928, is devoted principally to the publication of the findings, rulings, and orders of the board. The report contains 18 tables, one of which shows the distribution of claims closed, according to industries, during the period covered by the report. This table is as follows:

DISTRIBUTION OF CLAIMS CLOSED, BY INDUSTRIES

| Industry | Number of claims closed | | | | | |
|---|---|---|---|---|---|---|
| | Fatal | Permanent total | Permanent partial | Temporary total | Rejected | Total |
| Lumber | 41 | 1 | 275 | 3,191 | 127 | 3,635 |
| Mining | 38 | 3 | 100 | 2,458 | 61 | 2,660 |
| Construction | 22 | 2 | 92 | 2,827 | 88 | 3,031 |
| Trade | 3 | ---------- | 37 | 1,491 | 52 | 1,583 |
| Manufacturing | 2 | ---------- | 37 | 895 | 24 | 958 |
| Miscellaneous | 4 | ---------- | 59 | 1,269 | 65 | 1,397 |
| Transportation | 2 | ---------- | 23 | 529 | 12 | 566 |
| Repair | 1 | ---------- | 26 | 1,184 | 21 | 1,232 |
| Utility | 4 | 2 | 14 | 408 | 6 | 434 |
| Agriculture | 1 | ---------- | 3 | 144 | 74 | 222 |
| Total | 118 | 8 | 666 | 14,396 | 530 | 15,718 |

### Indiana

THE ANNUAL report of the Industrial Board of Indiana for the fiscal year ending September 30, 1928, contains many interesting facts concerning the operation of the workmen's compensation law in that State. As the Indiana compensation law covers only minors legally employed, the Department of Women and Children checks all the accident reports received by the industrial board and reports to the industrial board in all cases of injuries to minors as to whether or not the records show their employment to have been legal at the time of accident under the Indiana child labor law. The report states that of the 1,069 accident reports investigated, reports on 663 were made to the industrial board, of which 199 were reported as cases of illegal employment and therefore not compensable under the Indiana compensation act.

The compensation act requires all the employers of the State to report to the industrial board all injuries of employees causing absence from work for more than one day. During the period covered by the report, 37,714 such injuries were reported, which was a decrease of 2,825 as compared with the number reported for the year previous. Of the 37,714 accidents reported during the year, there were 204 workmen killed, 619 suffered the loss of some member of the body, and 2,476 were injured in coal mining, 31 of these cases resulting in the death of the miner. The automobile industry reported 2,498 accidents, 2 of which resulted fatally. In the manufacture of iron and steel 746 employees were injured, in 14 of which cases the injuries caused death.

In the making of reports of accidents the employers are required to give the average weekly wages of the injured employee, and the average as figured by the industrial board on the basis of these reports amounted to $26.77. There were 1,801 women injured in industry, whose weekly wages averaged $14.25. Two hundred and forty-one children 16 years of age and under were injured, the average weekly wages in these cases being $12.15.

### Nevada

THE Nevada Industrial Commission, in its biennial report reviewing the administration of the Nevada workmen's compensation act, for the period from July 1, 1926, to June 30, 1928, presents a summary of the experience of that State for the 15 years during which the law has been in effect. The commission expressed its satisfaction "in being able to report that every dollar of premiums collected from employers is available for payment to injured employees, as the earnings from our invested reserves exceed our administrative expense by approximately $25,000 per year, while in many States not enjoying the benefits of a State insurance fund 40 per cent of premiums collected is required for administrative expense, and usually only 50 to 60 per cent of the amount received from the employer is available for the relief of his injured workmen."

Among the statistical tables presented in the report there is a table showing the frequency of accidents by industry and the extent of disability for the fiscal year ending June 30, 1928, a summary of which is given below:

FREQUENCY OF ACCIDENTS, BY CLASSES AND EXTENT OF DISABILITY, JULY 1, 1927, TO JUNE 30, 1928

| Industry | Number of full-time workers | Deaths and permanent total disabilities | Permanent partial disabilities | Temporary total disabilities | | Number of accidents— | |
|---|---|---|---|---|---|---|---|
| | | | | 7 days and over | Under 7 days | Per 1,000 full-time workers | Per $100,000 of pay roll |
| Mining | 2,637 | 13 | 62 | 555 | 460 | 413.4 | 21.4 |
| Ore reduction | 605 | 1 | 5 | 43 | 14 | 104.0 | 5.3 |
| Nevada Consolidated Copper Co | 2,094 | 0 | 20 | 247 | 30 | 141.83 | 8.0 |
| Railroads | 263 | 1 | 4 | 10 | 28 | 163.50 | 9.6 |
| Utilities | 441 | 0 | 1 | 58 | 17 | 172.34 | 10.9 |
| State and municipal, compulsory | 2,240 | 0 | 9 | 109 | 152 | 120.54 | 6.1 |
| Miscellaneous | 3,680 | 1 | 26 | 344 | 608 | 266.03 | 15.3 |
| Total | 11,960 | 16 | 127 | 1,366 | 1,309 | 235.62 | 12.8 |

### New Hampshire

THE New Hampshire Bureau of Labor, in its seventeenth biennial report, for the fiscal period ending June 30, 1928, devotes a section of the report to the subject of workmen's compensation, in which the commissioner recommended to the incoming legislature that it give serious consideration to the enactment of a compensation law for New Hampshire that would place the State on a par with other States. The report pointed out that arrangements had been made to have three representatives of the New Hampshire Manufacturers'

Association and the legislative committee of the New Hampshire State Federation of Labor meet for conference. The labor commissioner was chosen to act as chairman during the deliberations. A new draft of a workmen's compensation bill resulted from the conference. It was pointed out that those opposed to the new draft "made a great deal out of what the workmen were giving up in allowing the elective feature after the accident to be taken away from them. Still the fact remains the present New Hampshire law is the only one in 42 States, having compensation laws, that retains such elective feature."

In discussing the change made by the new draft in the administration of the law by doing away with the court system and establishing an independent accident board, the report contains the following:

> The giving up of this feature, in the minds of men who have made careful study of the operation of compensation laws, was more than offset by the establishment of an industrial accident board to administer the provisions of the bill, to say nothing of the increased indemnities, the classified list of injuries plus the payment of compensation during the healing period, and the four weeks medical benefits.
>
> No one interested in this piece of legislation claimed it was the last word in law of this kind, but they were convinced it would lay a good foundation for a compensation law for the State of New Hampshire, and was a long step in advance of our present law.
>
> Under our present law the necessity of going to court on account of an industrial accident and summoning fellow employees is bound to create some bad feeling as well as costly litigation. This would have been avoided in a large degree by the creating of the board proposed in this bill and would tend to promote more harmonious relations between employers and employees.
>
> In many of the cases taken before the courts employees are obliged to testify against their employers. The injured workman who has brought suit against his employer is often forced to sever his connection with the plant with which he has been identified for a number of years. Under a clearly defined compensation law employers and employees work to the end to insure permanent employment in the industry.
>
> Regardless of the failure of the legislature to enact this bill into law two things were accomplished. First, the public was able to get some idea of the trend for this class of legislation, for it was clearly shown in the arguments before the judiciary committee, by those in favor, that the proposed law was greatly desired by employers and workers of the State. Second, it was the first time in the history of New Hampshire that employers and labor have gone before a legislative committee in agreement for the enactment of a labor law.

### Pennsylvania

THE Department of Labor and Industry of the Commonwealth of Pennsylvania, in its publication Labor and Industry for the month of March, 1929, presents compensation statistics for the year 1928. The number of compensable accident cases during the year 1928, by industry, as shown in the report, is as follows:

NUMBER OF COMPENSABLE ACCIDENT CASES IN 1928, BY INDUSTRY

| Industry | Number of cases | | | |
|---|---|---|---|---|
| | Fatal | Permanent disability | Temporary disability | Total |
| Construction and contracting | 201 | 302 | 9,394 | 9,897 |
| Building construction | 76 | 148 | 4,859 | 5,083 |
| Other construction | 82 | 63 | 1,987 | 2,132 |
| Contracting | 43 | 91 | 2,548 | 2,682 |
| Manufacturing | 332 | 1,588 | 26,761 | 28,681 |
| Chemicals and allied products | 33 | 67 | 1,367 | 1,467 |
| Clay, glass, and stone products | 23 | 80 | 2,258 | 2,361 |
| Clothing | 6 | 31 | 882 | 919 |
| Food and kindred products | 23 | 82 | 2,542 | 2,647 |
| Leather, rubber, and composition goods | 8 | 42 | 854 | 904 |
| Lumber, wood, and their products | 27 | 174 | 2,183 | 2,384 |
| Paper and paper products, printing and publishing | 11 | 71 | 1,206 | 1,288 |
| Textiles | 14 | 73 | 1,357 | 1,444 |
| Metals and metal products | 183 | 930 | 13,690 | 14,803 |
| Blast furnaces and steel works | 29 | 44 | 615 | 688 |
| Rolling mills | 51 | 203 | 3,127 | 3,381 |
| Foundries and machine shops | 14 | 155 | 2,858 | 3,027 |
| Fabrication | 66 | 433 | 5,262 | 5,761 |
| Car-repair shops | 14 | 67 | 815 | 896 |
| Automobile service stations | 9 | 28 | 1,013 | 1,050 |
| Other manufacturing | 4 | 38 | 422 | 464 |
| Coal mining | 949 | 996 | 25,701 | 27,646 |
| Anthracite | 469 | 486 | 13,469 | 14,424 |
| Bituminous | 480 | 510 | 12,232 | 13,222 |
| Quarrying and mining other than coal mining | 35 | 57 | 1,312 | 1,404 |
| Transportation and public utilities | 115 | 95 | 2,870 | 3,080 |
| Steam railroads | 31 | 33 | 447 | 511 |
| Other transportation | 19 | 28 | 1,176 | 1,223 |
| Public utilities | 65 | 34 | 1,247 | 1,346 |
| Hotels and restaurants | 3 | 24 | 745 | 772 |
| Trading | 56 | 126 | 4,233 | 4,415 |
| Retail | 45 | 103 | 3,401 | 3,549 |
| Wholesale | 11 | 23 | 832 | 866 |
| State and municipal | 79 | 48 | 1,698 | 1,825 |
| Miscellaneous | 57 | 111 | 3,455 | 3,623 |
| Total | 1,827 | 3,347 | 76,169 | 81,343 |

### Utah

THE Industrial Commission of Utah published five bulletins for the biennial period from July 1, 1926, to June 30, 1928. Bulletin No. 1 contains a synopsis of decisions rendered by the commission and a digest of Utah Supreme Court rulings. Bulletin No. 2 contains financial statements of the State Insurance fund, Industrial Commission of Utah, firemen's pension fund, and the employees' combined injury benefit fund. Bulletin No. 3 contains the industrial commission's accident statistical report. Bulletin No. 4 contains coal and metal mines reports, including reports of factory and labor inspections. Bulletin No. 5 contains Utah agricultural statistics, compiled by the United States Department of Agriculture, Bureau of Agricultural Economics.

Bulletin No. 3, containing the industrial accident statistical report, shows that for the fiscal year ending June 30, 1928, fatalities numbered 83, as compared with 94 during the previous year, permanent total disabilities numbered 9 as compared with 4 during the previous year, permanent partial disabilities numbered 305 as compared with 352 during the previous year, and temporary injuries numbered 13,654 as compared with 14,650 during the previous year. Of the 83 fatalities occurring during the fiscal year ending June 30, 1928, 32 occurred in metal mines, 17 in coal mines, 6 in smelters and concentration plants, and 28 in other industries. The 83 deceased employees left an aggregate of 46 widows and 125 minor children.

### Nova Scotia

THE Workmen's Compensation Board of Nova Scotia, in its report for the year 1928, presents several interesting tables showing the result of its experience for that year. The report also contains an analysis of the injuries reported in 1927. The following table, taken from the report, shows the number of accidents in 1928, by industry and extent of disability:

NUMBER OF ACCIDENTS COMPENSATED IN 1928, BY INDUSTRY GROUP

| Industry group | Accident claims finally disposed of | | | | | | Total |
|---|---|---|---|---|---|---|---|
| | Temporary disability | | Permanent disability | Deaths | Total | Claims partially disposed of | |
| | Compensation | Medical aid only | | | | | |
| Mining | 2,205 | 179 | 54 | 21 | 2,459 | 380 | 2,839 |
| Lumbering and woodworking | 1,102 | 195 | 37 | 3 | 1,337 | 232 | 1,569 |
| Iron and steel | 331 | 553 | 18 | 5 | 907 | 86 | 993 |
| Manufacturing and operating not otherwise specified | 299 | 162 | 5 | 4 | 470 | 72 | 542 |
| Building and construction | 245 | 147 | 3 | 2 | 397 | 71 | 468 |
| Public utilities | 164 | 103 | 4 | 1 | 272 | 80 | 352 |
| Transportation | 226 | 119 | 6 | 3 | 354 | 53 | 407 |
| Shipping and navigation | 8 | 4 | 2 | | 14 | 3 | 17 |
| Provincial highways department | 107 | 15 | 3 | 2 | 127 | 44 | 171 |
| Dominion Government employees | 229 | 22 | 8 | 1 | 260 | 48 | 308 |
| Total | 4,916 | 1,499 | 140 | 42 | 6,597 | 1,069 | 7,666 |

# LABOR LAWS AND COURT DECISIONS

## Legal Regulation of Hours of Work of Salaried Employees

A SURVEY of the existing laws and regulations on hours of work of salaried employees in all countries possessing such legislation has been made by the International Labor Office, to serve as a basis for the discussion of this subject at the 1929 session (the twelfth) of the International Labor Conference.[1] Colonies and protectorates, except in the case of the British Empire, were not included. The survey covered all classes of salaried workers—men, women, young persons, and children—classed as nonmanual workers or who were working in commercial undertakings, except salaried employees in industry coming under the Washington convention on the 8-hour day and the 48-hour week. No account was taken of agricultural, maritime, home, or domestic workers.

It was found that the great majority of the 55 member States of the International Labor Organization have legislation providing for a more or less general limitation of working hours, either for all salaried employees, or at least for shop assistants, although in some countries the legislation does not apply throughout the whole territory, and in others it applies only to women and children or to young persons.

In 22 of the countries covered the hours of work of both manual workers and salaried employees in industrial and commercial undertakings, and in some cases of all persons engaged in paid work, are regulated by a single enactment. These countries are: In Europe—Austria, Belgium, Bulgaria, Czechoslovakia, France, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Yugoslavia, Spain, Switzerland (Cantons of Basle Town and Glarus), and the Soviet Republic; in South America—Argentina (States of Cordoba, Mendoza, Salta, San Juan, San Luis, Santa Fé, Tucuman), Costa Rica, Ecuador, Guatemala, Panama, Uruguay, and Venezuela.

In other countries the laws cover all workers in certain specified classes of industrial and commercial establishments; namely, in factories, shops, and offices, Alberta, Canada; in offices and shops, New Zealand; in factories and shops, Western Australia, Victoria, and Queensland, Australia; and in shops, Greece, Gibraltar, Kenya, Grenada (certain classes), Jamaica (certain classes), South West Africa, and Union of South Africa (Cape of Good Hope, Natal, Orange Free State, and Transvaal).

The laws of certain other countries cover women and children, or young persons under a certain age, either in all establishments or in certain classes of establishments. The legislation of Argentina (Federal act) and Peru applies to women and children in general; of Ontario, Canada, to those in factories and shops; and of Tasmania, Australia, and Manitoba, Canada, to those in shops. It applies to young persons in various classes of establishments in Denmark, and

[1] International Labor Office. Hours of work of salaried employees. Report and draft questionnaire. (Item IV on the agenda of the International Labor Conference, 12th session, Geneva, 1929.) Geneva, 1929.

to young persons in shops in Great Britain; Irish Free State; British Columbia and Nova Scotia, Canada; and South Australia and New South Wales, Australia.

In seven countries the legislation regulating the hours of labor applies generally to salaried employees as such. These countries are: Finland, Germany, Luxemburg, Bolivia, Chile, Peru (women and children), and Salvador.

The report contains the following general summary of the findings of the investigation as to stipulated working hours:

> In the first place, it appears that, with few exceptions, most countries take working hours as meaning the time during which the employee is at the disposal of his employer, excluding statutory rest periods. As regards normal hours of work, the great majority of systems of legislation applying to commercial undertakings fix these at 8 hours per day or 48 hours per week. In point of fact, these or even shorter hours are the maxima prescribed by 24 out of 31 systems of legislation, e. g., in Finland, where the maximum week for commercial employees is 47 hours; in Poland, where it is 46 hours; and in Latvia and the Soviet Republic, where the maximum working day for intellectual workers is 6 hours. The legislation applying to shops only generally provides for longer hours. Some of them, however, have also adopted the 48-hour maximum. Out of 24 acts relating to shops, only 6 provide that working hours are not to exceed 48; 8 others that they are not to exceed 52 hours; and 2 go up to 54 and 8 to 60 hours or more.
>
> It is in offices that the daily and weekly maxima of 8 and 48 hours, respectively, are most widely found.
>
> In certain countries, such as Austria, Basle Town, France, Greece, the Netherlands, Queensland, and Victoria, normal maxima higher than those fixed for undertakings in general are authorized for certain branches.
>
> But in a considerable number of countries the general normal maxima have also been fixed for such classes of undertakings as hospitals, clinics, hotels, restaurants, etc., which must work continuously in order to meet the needs of the community. Indeed, there are none of the classes of undertakings dealt with in this chapter for which some country has not fixed a 48-hour week. This remark, while not perhaps conclusive, nevertheless raises a presumption that there are no insurmountable difficulties in the way of adopting this maximum for the general normal standard.
>
> The distribution of working hours over periods exceeding one day or one week is provided for in a certain number of countries, but chiefly for certain classes of undertakings where more flexibility is required by reason of the nature of the work. These distributions, which are, after all, only administrative methods used generally to a very restricted extent, do not affect the principle of a maximum of working hours.
>
> Making up for lost time and compensation for extra time do not * * * appear to be expedients very widely used. Their aim is merely to regularize, in the one direction or the other, the normal working hours laid down by the law, and the result therefore is that, as far as possible, and, having regard to the various cases which arise in practice, they tend to insure the observance of the maxima prescribed for working hours.

## Suit for Damages Based on Blacklisting Upheld

A SUIT for damages based on the blacklisting of an employee because of membership in a labor union was upheld by the Supreme Court of North Carolina on January 9, 1929.[1] David Goins was employed by the North Carolina Granite Corporation as a stonecutter at its quarry in Surry County, N. C., prior to January 1, 1922. On that date he was discharged from the employment. He sought employment as a stonecutter by other persons, firms, and corporations

[1] Goins v. Sargent et al., 146 S. E. 131.

in the State who required the services of stonecutters, but failed to obtain such employment because of the activity of his former employers. He was compelled to go to other States to obtain employment at his trade. Because of being separated from his wife and children and suffering inconvenience and annoyance, he brought suit against his former employers for the sum of $10,000. Goins alleged that the only ground upon which the company discharged him from its employment was that he was, while in its employment, a member in good standing of the Granite Cutters' International Association. Goins further alleged that the corporation notified other persons, firms, and corporations doing business in North Carolina and requiring for their business stone quarried and cut by the former employer that it would not deliver stone to any person, firm, or corporation who employed or retained him in their or its employment, and that the only ground upon which it has refused or declined to deliver stone to persons who employ Goins was that he was a member in good standing of the labor union. The former employer filed papers in the suit contending that the facts stated were not sufficient to constitute a legal cause of action for damages.

The court held in favor of Goins and the case was taken on appeal to the Supreme Court of North Carolina. That court on January 9, 1929, rendered a decision affirming the judgment of the lower court in favor of Goins. The court quoted sections 4477 and 4478 of the Consolidated Statutes of North Carolina of 1919, which provide as follows:

4477. *Blacklisting employees.*—If any person, agent, company, or corporation, after having discharged any employee from his or its service, shall prevent or attempt to prevent, by word or writing of any kind, such discharged employee from obtaining employment with any other person, company, or corporation, such person, agent, or corporation shall be guilty of a misdemeanor and shall be punished by a fine not exceeding $500; and such person, agent, company, or corporation shall be liable in penal damages to such discharged person, to be recovered by civil action. This section shall not be construed as prohibiting any person or agent of any company or corporation from furnishing in writing, upon request, any other person, company, or corporation to whom such discharged person or employee has applied for employment, a truthful statement of the reason for such discharge.

4478. *Conspiring to blacklist employees.*—It shall be unlawful for two or more persons to agree together to blacklist any discharged employee or to attempt, by words or writing or any other means whatever, to prevent such discharged employee, or any employee who may have voluntarily left the service of his employer, from obtaining employment with any other person or company. Persons violating the provisions of this section shall be guilty of a misdemeanor and shall be fined or imprisoned, or both, at the discretion of the court.

The court held that the facts alleged by Goins constituted a cause of action under the laws of the State and that he was entitled to recover penal damages. The court referred to the case of Seward *v.* Receivers of Seaboard Air Line Railway Co., 159 N. C. 242, 75 S. E. 34, and pointed out that it was held in that case that the statutes did not attempt to interfere with the right of an employer to discharge an employee for cause or without cause. They do not seek to prohibit an employer from communicating to other employers the nature and character of their employees when the facts would be for their interest. The purpose of the statutes is to protect employees in the employment of their natural rights and privileges guaranteed them by the constitution, viz, the right to sell their labor and acquire property thereby.

In the instant case the former employer notified other persons firms, and corporations, who would otherwise have employed Goins, of the fact of the discharge, of the ground for the same, and advised them that if they employed Goins as a stonecutter or in any capacity the former employer would refuse to deliver stone to them. This notice was given without any request, in writing or otherwise, for the same. It was given, not to promote the interests of the former employer or other persons, but to prevent Goins from obtaining employment in North Carolina. The court said that for the purpose of the appeal these facts alleged by Goins were admitted to be true, and if they were established at a trial by a verdict then Goins will be entitled to recover from his former employer penal damages to be assessed by the jury. The court further stated:

> By virtue of the statute, plaintiff is not required to allege or prove malice or actual damages; both are presumed. The general assembly of this State evidently thought it just to relieve discharged employees, who were prevented by former employers from obtaining employment by other persons, firms, or corporations, by notice of the fact and ground for the discharge, without request, of the burden of proving either malice or actual damages. The right of a prospective employer to obtain from former employers truthful statements as to the ground of the discharge is fully safeguarded by the provisions of the statute. The statute has now been in force in this State for 20 years, without amendment or alteration. It serves a useful purpose, and has evidently met with the approval of the people of this State.

## Court Decisions Affecting Labor

THE International Labor Office has recently published its third International Survey of Legal Decisions on Labor Law, 1927. The two prior surveys covered the decisions of courts affecting labor for the years 1925 and 1926. The present survey has enlarged the scope and usefulness of the publication by including, in addition to decisions of courts of England, France, Germany, and Italy, a collection of some of the most interesting and important decisions rendered by courts in the United States during the year 1927.

There are published in some countries compilations of the decisions of courts affecting labor. These compilations are difficult of access to the foreign reader, they are made from a national and not from an international viewpoint, and they are usually available only in the language of the country in which they are published. The International Survey of Legal Decisions on Labor Law, published by the International Labor Office, presents annually in English, French, and German a collection of decisions of courts affecting labor in England, France, Germany, Italy, and now the United States. The survey "facilitates the study of foreign labor legislation; it promotes the study of comparative law, especially in matters which might be subjected to international regulation, and thereby helps to standardize and improve labor legislation."

# HOUSING

## Expenditures for Building Operations in Representative Cities 1921 to 1928

DATA have been collected since 1921 concerning the amount expended for building operations in 257 identical cities. The information was obtained from the record of permits issued by the local building officials of the different cities. The costs are the estimated costs given by the prospective builder at the time of applying for his permit. The cost of the building only is included. The total expenditure for new buildings was less in these cities during 1928 than for any year since 1922 and fell below $3,000,000,000 for the first time since that year. Table 1 below shows the estimated expenditures for residential buildings, nonresidential buildings, and total new buildings; the population as estimated by the Census Bureau as of July 1 each year; the number of families provided for; the ratio of families provided for to each 10,000 of population; the index number of each of these items; and the index number of families provided for weighted by population.

TABLE 1.—ESTIMATED EXPENDITURES AND INDEX NUMBERS OF EXPENDITURES FOR NEW RESIDENTIAL BUILDINGS, NONRESIDENTIAL BUILDINGS, AND TOTAL NEW BUILDINGS; ALSO FAMILIES PROVIDED FOR AND RATIO OF FAMILIES PROVIDED FOR TO EACH 10,000 OF POPULATION IN 257 IDENTICAL CITIES IN 1921 TO 1928, INCLUSIVE

| Year | Residential buildings | | Nonresidential buildings | | Total new buildings | |
|---|---|---|---|---|---|---|
| | Estimated expenditure | Index number | Estimated expenditure | Index number | Estimated expenditure | Index number |
| 1921 | $937,352,739 | 100.0 | $635,775,199 | 100.0 | $1,573,127,938 | 100.0 |
| 1922 | 1,612,352,921 | 172.0 | 876,276,713 | 137.8 | 2,488,629,634 | 158.2 |
| 1923 | 2,000,986,900 | 213.5 | 1,070,596,718 | 168.4 | 3,071,583,618 | 195.3 |
| 1924 | 2,070,276,772 | 220.9 | 1,137,631,080 | 178.9 | 3,207,907,852 | 203.9 |
| 1925 | 2,461,546,270 | 262.6 | 1,343,880,884 | 211.4 | 3,805,427,154 | 241.9 |
| 1926 | 2,255,994,627 | 240.7 | 1,300,840,876 | 204.6 | 3,556,835,503 | 226.1 |
| 1927 | 1,906,003,260 | 203.3 | 1,231,785,870 | 193.7 | 3,137,789,130 | 199.5 |
| 1928 | 1,859,429,751 | 198.4 | 1,135,549,986 | 178.6 | 2,994,979,737 | 190.4 |

| Year | Population | | Families provided for | | | |
|---|---|---|---|---|---|---|
| | As estimated by Census Bureau for specified year | Index number | Number | Index number | Ratio to each 10,000 of population | Index number weighted by population |
| 1921 | 36,575,118 | 100.0 | 224,545 | 100.0 | 61.4 | 100.0 |
| 1922 | 37,511,516 | 102.6 | 377,305 | 168.0 | 100.6 | 163.7 |
| 1923 | 38,447,913 | 105.1 | 453,673 | 202.0 | 118.0 | 192.2 |
| 1924 | 39,384,311 | 107.7 | 442,919 | 197.3 | 112.5 | 183.2 |
| 1925 | 40,320,708 | 110.2 | 491,222 | 218.8 | 121.8 | 198.4 |
| 1926 | 41,257,106 | 112.8 | 462,214 | 205.8 | 112.0 | 182.4 |
| 1927 | 42,058,897 | 115.0 | 406,095 | 180.9 | 96.6 | 157.3 |
| 1928 | 42,767,125 | 116.9 | 388,678 | 173.1 | 90.9 | 148.1 |

The peak expenditure for new buildings was reached in 1925, when $3,805,427,154 was expended for building operations, according to permits issued in these 257 cities. The expenditure for 1928 was nearly a billion dollars less than the 1925 peak. Each year since

1925 has shown a decrease in amount expended for new buildings over the preceding year. The 1928 expenditure was 21.3 per cent less than the 1925 expenditure, but was 90.4 per cent above the expenditure for 1921.

Expenditures for residential and nonresidential buildings each reached a peak in 1925. The amount expended for residential buildings that year was $2,461,546,270. During 1928 the expenditure for residential buildings was $1,859,429,751, which was 24.5 per cent less than the 1925 expenditure, but was 98.4 per cent above the expenditure for 1921. The expenditure for nonresidential buildings during 1925 was $1,343,880,884 and during 1928 it was $1,135,549,986. That is, during 1928 15.5 per cent less was expended for nonresidential buildings than during 1925 or 78.6 per cent more than during 1921.

The population of these 257 cities on July 1, 1921, was 36,575,118 according to the estimate of the Census Bureau and by July 1, 1928, it had risen to 42,767,125, or 16.9 per cent above the 1921 population.

During 1925 housing units were provided for 491,222 families. This is the record year in regard to families provided for. During 1928 only 388,678 families were provided with dwelling places in new buildings, this being 20.9 per cent less than the number accommodated during 1925 and 73.1 per cent more than those provided for during 1921.

In 1921 there were 61.4 families provided for to each 10,000 of population. By 1925 this ratio had risen to 121.8 but in 1928 had fallen to 90.9. The index number of families provided for weighted by population reached a peak of 198.4 in 1925 and then declined steadily each year until it stood at 148.1 in 1928.

## Average Estimated Cost of Dwellings per Family

TABLE 2 shows the average cost each year, 1921 to 1928, of dwelling accommodations per family in each of the different kinds of dwellings for which permits were issued in the 257 identical cities from which reports were received every year.

The costs from which these averages were computed are the costs of the building as stated by the prospective builder at the time of applying for his permit to build. Land costs are not included. There may be a profit or loss between the cost to the builder and the cost to the home purchaser.

TABLE 2.—AVERAGE COST OF DWELLINGS PER FAMILY IN 257 IDENTICAL CITIES, 1921 TO 1928

| Year | Average cost of dwellings per family [1] in— | | | | Index numbers of cost of dwellings per family in— | | | |
|---|---|---|---|---|---|---|---|---|
| | One-family dwellings | Two-family dwellings [2] | Multi-family dwellings [3] | All classes of dwellings | One-family dwellings | Two-family dwellings [2] | Multi-family dwellings [3] | All classes of dwellings |
| 1921 | $3,972 | $3,762 | $4,019 | $3,947 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1922 | 4,134 | 3,801 | 3,880 | 4,005 | 104.1 | 101.0 | 96.5 | 101.5 |
| 1923 | 4,203 | 4,159 | 4,001 | 4,127 | 105.8 | 110.6 | 99.6 | 104.6 |
| 1924 | 4,317 | 4,336 | 4,418 | 4,352 | 108.7 | 115.3 | 109.9 | 110.3 |
| 1925 | 4,618 | 4,421 | 4,289 | 4,464 | 116.3 | 117.5 | 106.7 | 113.1 |
| 1926 | 4,725 | 4,480 | 4,095 | 4,422 | 119.0 | 119.1 | 101.9 | 112.0 |
| 1927 | 4,830 | 4,368 | 4,170 | 4,449 | 121.6 | 116.1 | 103.8 | 112.7 |
| 1928 | 4,937 | 4,064 | 4,129 | 4,407 | 124.3 | 108.0 | 102.7 | 111.7 |

[1] Buildings only; see text above.
[2] Includes one-family and two-family dwellings with stores.
[3] Includes multifamily dwellings with stores.

The average cost of the 1-family dwellings for which permits were issued has advanced nearly a thousand dollars between 1921 and 1928. In 1921 the average cost of the separate dwelling was $3,972, while in 1928 it was $4,937. There has been a steady increase each year over the preceding year. The average cost of the 1-family dwellings for which permits were issued in 1928 was 24.3 per cent higher than the average cost of those for which permits were issued during 1921.

The average cost of 2-family dwellings was $3,762 per family in 1921. This rose steadily until a peak of $4,480 per family, or 19.1 per cent above the 1921 cost, was reached in 1926. In 1928 the average cost of 2-family dwellings was $4,064 per family. This is 8 per cent above the 1921 cost.

The average cost per family provided for in apartment houses was lowest in 1922, the cost being $3,880 per family that year. By 1924 the average cost had risen to $4,418 per family. In this year average expenditure per family provided for was higher in apartment houses than in single-family dwellings. In 1925 and 1926 the per family cost of multi-family dwellings declined, climbed slightly in 1927, and again sank in 1928, the 1928 cost being $4,129 per family, or only 2.7 per cent higher than the 1921 cost.

The average cost per family of all dwelling units in new buildings was $3,947 in 1921. In 1925 a peak cost of $4,464 was reached. The cost in 1928 was $4,407, which was an increase of 11.7 per cent over the 1921 per family cost.

The Bureau of Labor Statistics collects monthly the wholesale prices of building material and from such figures computes index numbers. Retail prices as paid by builders are not avaliable, but it is believed that the trend of retail prices follows closely the trend of wholesale prices. The index number of wholesale prices shown in Table 3 differs from that previously shown because of a different weighting for the different building materials.

The index numbers shown in Table 3 for wages in the building trades are wage rates for union labor only. In many cities the building trades are highly organized, while in others there is much nonunion labor. The bureau has no data concerning wages of nonunion labor in the building trades. It is thought, however, that the trend of wages of nonunion labor would follow closely that of union labor.

The price of building material reached a peak of 111.6 in 1923 and fell to a low of 95.8 in 1927. The 1928 price stood at 96.2. Union wage rates reached their highest point, 129, in 1928, rising from the low of 93.4 in 1922.

TABLE 3.—INDEX NUMBER OF WHOLESALE PRICES OF BUILDING MATERIAL AND OF UNION WAGE RATES IN THE BUILDING TRADES

| Year | Index numbers for | | Year | Index numbers for | |
|---|---|---|---|---|---|
| | Wholesale prices of building material | Union wage rates per hour in the building trades | | Wholesale prices of building material | Union wage rates per hour in the building trades |
| 1921 | 100.0 | 100.0 | 1925 | 104.4 | 116.3 |
| 1922 | 99.9 | 93.4 | 1926 | 102.7 | 124.0 |
| 1923 | 111.6 | 103.6 | 1927 | 95.8 | 128.5 |
| 1924 | 105.0 | 112.2 | 1928 | 96.2 | 129.0 |

## Apartment House Construction in American Cities, 1928

THERE is no abatement of the trend toward apartment houses as dwelling places in the cities of the United States. Figures taken from permits issued in 257 cities in the United States having a population of 25,000 or over show that the popularity of the multi-family dwelling is still growing. A multi-family dwelling is one designed to accommodate three or more families. The term is equivalent to the more generally used appellations "apartment house" or "tenement house."

Reports have been received from 257 identical cities continuously since 1921 showing the number of families provided for and the class of dwelling with which they were provided. This information is shown below in Table 1.

In 1928 homes were provided in new buildings for 388,678 families; 53.7 per cent of these were in apartment houses; 35.2 per cent in 1-family dwellings, and 11.1 per cent in 2-family dwellings. This is the first year since the compilation of these data by the bureau that more than half of the families provided for in new buildings were housed in apartment houses. In new construction in 1921 only 24.4 per cent of all families provided for were housed in apartment houses, and 58.3 per cent in 1-family dwellings.

TABLE 1.—PER CENT OF FAMILIES PROVIDED FOR IN THE DIFFERENT KINDS OF DWELLINGS IN 257 IDENTICAL CITIES, 1921 TO 1928, INCLUSIVE

| Year | Number of families provided for in all classes of dwellings | Per cent of families provided for in— | | | Year | Number of families provided for in all classes of dwellings | Per cent of families provided for in— | | |
|---|---|---|---|---|---|---|---|---|---|
| | | One-family dwellings | Two-family dwellings [1] | Multi-family dwellings [2] | | | One-family dwellings | Two-family dwellings [1] | Multi-family dwellings [2] |
| 1921 | 224,545 | 58.3 | 17.3 | 24.4 | 1925 | 491,222 | 46.0 | 17.5 | 36.4 |
| 1922 | 377,305 | 47.5 | 21.3 | 31.2 | 1926 | 462,214 | 40.7 | 13.9 | 45.4 |
| 1923 | 453,673 | 45.8 | 21.2 | 33.0 | 1927 | 406,095 | 38.3 | 13.4 | 48.3 |
| 1924 | 442,919 | 47.6 | 21.5 | 30.9 | 1928 | 388,678 | 35.2 | 11.1 | 53.7 |

[1] Includes 1-family and 2-family dwellings with stores combined.
[2] Includes multi-family dwellings with stores combined.

This is the third consecutive year that more family units have been provided in apartment houses than in 1-family dwellings. Just what effect this change in the type of dwelling will have on the social, economic, and political life of the country is hard to determine. That it will have its impress on the character and life of the people is an undoubted fact. Few apartment-house dwellers are home owners. As has been pointed out before by the bureau, apartment-house construction is changing the character of building labor by giving more opportunity for work to certain trades, namely, structural-iron workers, concrete workers, marble and stone cutters, etc., and less to other trades, especially carpenters.

## Comparison of Conditions in Cities of Over 500,000

In the 14 cities of the United States which have a population of 500,000 or over 67.2 per cent of the families provided for in 1928 were housed in apartment houses, 22.1 per cent in 1-family dwellings, and 10.7 per cent in 2-family dwellings. In 1927 the same classes of dwellings housed 60.8 per cent, 25.8 per cent, and 13.4 per cent, respectively. These 14 cities provided for 236,113 families in 1927 and 232,681 families in 1928, as shown in Table 2.

Data are shown in this table for New York as an entity and for each of the five boroughs separately. Chicago provided for a larger portion of families in apartment houses than any other city, 80.7 per cent of the total housing units in new dwellings being in this class of building in 1928 as compared with 12.2 per cent in 1-family dwellings.

The per cent of families housed in new apartment houses in New York practically equaled that of Chicago, 80.3 per cent of the new housing units being in apartment houses and 12.4 per cent in 1-family dwellings.

There was a great difference, however, in the class of homes provided in the different boroughs. In Manhattan 99.9 per cent of new housing units were in apartment houses and only one-tenth of 1 per cent in 1-family dwellings. In the borough of Richmond 60.3 per cent were in 1-family dwellings and only 23.3 per cent in apartment houses.

Baltimore built a larger proportion of 1-family dwellings than any other city in this population group, but even in Baltimore there was an increase in the percentage of families provided for in apartment houses in 1928 as compared with 1927. Detroit and San Francisco were the only cities in the United States having a population of 500,000 or over where a larger percentage of the families provided for in new buildings were housed in 1-family dwellings in 1928 than in 1927. In 1927 there were 15,614 families provided for in new buildings in Detroit; of this number 35.9 per cent were accommodated in 1-family dwellings. In 1928 of the 15,929 families provided for, 42.7 per cent were housed in 1-family dwellings.

Boston, Buffalo, Cleveland, Detroit, and Milwaukee built large numbers of 2-family houses.

TABLE 2.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT TYPES OF DWELLINGS IN CITIES HAVING A POPULATION OF 500,000 OR OVER IN 1921, 1927, AND 1928

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | | City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|---|---|---|---|---|
| | | One-family dwellings | Two-family dwellings [1] | Multi-family dwellings [2] | | | One-family dwellings | Two-family dwellings [1] | Multi-family dwellings [2] |
| Baltimore, Md.: | | | | | Buffalo, N. Y.: | | | | |
| 1921 | 2,176 | 85.0 | 4.5 | 10.5 | 1921 | 2,405 | 51.6 | 48.0 | 0.4 |
| 1927 | 3,546 | 94.4 | 0.2 | 5.4 | 1927 | 3,373 | 34.2 | 36.7 | 29.1 |
| 1928 | 2,884 | 86.4 | ------- | 13.6 | 1928 | 3,181 | 22.1 | 44.5 | 33.4 |
| Boston, Mass.: | | | | | Chicago, Ill.: | | | | |
| 1921 | 878 | 15.5 | 30.5 | 54.0 | 1921 | 12,252 | 37.9 | 17.6 | 44.6 |
| 1927 | 5,316 | 10.3 | 32.2 | 57.5 | 1927 | 41,201 | 13.6 | 10.2 | 76.2 |
| 1928 | 6,805 | 9.5 | 28.0 | 62.5 | 1928 | 34,447 | 12.2 | 7.1 | 80.7 |

[1] Includes 1-family and 2-family dwellings with stores combined.
[2] Includes multifamily dwellings with stores combined.

TABLE 2.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT TYPES OF DWELLINGS IN CITIES HAVING A POPULATION OF 500,000 OR OVER IN 1921, 1927, AND 1928—Continued

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | One-family dwellings | Two-family dwellings | Multi-family dwellings |
| Cleveland, Ohio: | | | | |
| 1921 | 4,084 | 35.5 | 40.5 | 24.0 |
| 1927 | 3,631 | 43.9 | 30.7 | 25.5 |
| 1928 | 3,167 | 42.8 | 21.7 | 35.5 |
| Detroit, Mich.: | | | | |
| 1921 | 6,743 | 46.9 | 17.9 | 35.2 |
| 1927 | 15,614 | 35.9 | 26.6 | 37.5 |
| 1928 | 15,929 | 42.7 | 28.4 | 28.9 |
| Los Angeles, Calif.: | | | | |
| 1921 | 19,572 | 68.0 | 16.9 | 15.2 |
| 1927 | 20,801 | 39.5 | 8.7 | 51.8 |
| 1928 | 21,081 | 31.3 | 10.0 | 58.8 |
| Milwaukee, Wis.: | | | | |
| 1921 | 2,212 | 44.9 | 38.2 | 16.9 |
| 1927 | 4,252 | 30.9 | 26.7 | 42.4 |
| 1928 | 4,965 | 19.7 | 22.3 | 58.0 |
| New York City, N. Y.: | | | | |
| 1921 | 51,360 | 31.6 | 24.2 | 44.2 |
| 1927 | 105,519 | 15.9 | 13.3 | 70.9 |
| 1928 | 109,523 | 12.4 | 7.2 | 80.3 |
| Bronx— | | | | |
| 1921 | 14,037 | 11.7 | 11.9 | 76.4 |
| 1927 | 30,025 | 4.0 | 8.5 | 87.5 |
| 1928 | 33,768 | 3.8 | 3.4 | 92.8 |
| Brooklyn— | | | | |
| 1921 | 16,636 | 24.1 | 44.0 | 31.9 |
| 1927 | 33,172 | 11.6 | 17.5 | 71.0 |
| 1928 | 28,938 | 9.1 | 12.5 | 78.4 |
| Queens— | | | | |
| 1921 | 13,256 | 60.0 | 24.4 | 15.6 |
| 1927 | 31,205 | 33.4 | 17.1 | 49.5 |
| 1928 | 28,797 | 29.4 | 9.8 | 60.8 |
| Manhattan— | | | | |
| 1921 | 4,837 | 0.7 | 3.7 | 95.5 |
| 1927 | 9,502 | [1] | [1] | 99.9 |
| 1928 | 15,983 | 0.1 | 0.1 | 99.9 |
| New York City, N. Y.—Contd. Richmond: | | | | |
| 1921 | 2,594 | 100.0 | | |
| 1927 | 1,615 | 77.9 | 20.6 | 1.5 |
| 1928 | 2,037 | 60.3 | 16.4 | 23.3 |
| Philadelphia, Pa.: | | | | |
| 1921 | 2,406 | 93.3 | | 6.7 |
| 1927 | 12,197 | 71.2 | 3.3 | 25.5 |
| 1928 | 10,576 | 69.2 | 7.3 | 23.4 |
| Pittsburgh, Pa.: | | | | |
| 1921 | 1,335 | 59.3 | 26.8 | 13.9 |
| 1927 | 2,588 | 73.8 | 7.6 | 18.7 |
| 1928 | 2,544 | 62.4 | 10.2 | 27.4 |
| St. Louis, Mo.: | | | | |
| 1921 | 2,072 | 49.0 | 24.1 | 26.8 |
| 1927 | 5,463 | 29.1 | 16.8 | 54.1 |
| 1928 | 7,190 | 23.4 | 18.7 | 57.9 |
| San Francisco, Calif.: | | | | |
| 1921 | 2,683 | 37.6 | 17.0 | 45.4 |
| 1927 | 8,674 | 31.1 | 9.5 | 59.3 |
| 1928 | 6,084 | 36.2 | 5.7 | 58.1 |
| Washington, D. C.: | | | | |
| 1921 | 2,195 | 75.4 | | 24.6 |
| 1927 | 3,938 | 47.3 | 0.5 | 52.2 |
| 1928 | 4,305 | 30.4 | 0.7 | 68.9 |
| Total (14 cities): | | | | |
| 1921 | 112,373 | 44.2 | 21.7 | 34.0 |
| 1927 | 236,113 | 25.8 | 13.4 | 60.8 |
| 1928 | 232,681 | 22.1 | 10.7 | 67.2 |

[1] Less than one-tenth of 1 per cent.

## Comparison of Conditions in Cities Under 500,000

IN TABLE 3 are shown cities having a population of 25,000 or over which provided for 200 or more families in either 1927 or 1928. The table shows figures for 1921, 1927, and 1928, where data are available for these three years. When the information is not available for 1921 it is shown for the earliest year for which data were collected. A few of the smaller cities, which have reached a population of 25,000 since 1920, are shown for 1927 and 1928 only.

Most of the cities having a population of 500,000 or less built most of their new family housing units in 1-family dwellings. There are some exceptions, however, even in cities having a population of less than 100,000. In Mount Vernon, N. Y., for instance, 83.7 per cent of the family units built in 1927 and 77 per cent of those built in 1928 were in apartment houses. The Bureau of the Census estimated the population of Mount Vernon to be 54,700 on July 1, 1928. Evanston, Ill., with a population of 47,600, accommodated 70.5 per cent of the families provided for in 1927 and 75.6 per cent of those provided for in 1928 in apartment houses.

In most of the cities which might be classed as suburbs of larger cities the majority of the family units provided were in apartment houses in 1927 and 1928. Among cities in this class are Yonkers, N. Y.; White Plains, N. Y.; Elizabeth, N. J.; East Cleveland, Ohio; Cambridge, Mass.; and Highland Park, Mich. In the last-named city only one-half of 1 per cent of the family units for which permits were issued in 1927 and only 2.6 per cent of those for which permits were issued in 1928 were 1-family dwellings.

Albany, N. Y.; Bethlehem, Pa.; Bridgeport, Conn.; Medford, Mass.; New Britain, Conn.; and Pawtucket, R. I., were large builders of 2-family dwellings.

Richmond, Ind., was the only city where no apartment houses were built in any of the three years for which data are shown.

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000 IN SPECIFIED YEARS.

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | 1-family dwellings | 2-family dwellings [1] | Multifamily dwellings [2] |
| Akron, Ohio: | | | | |
| 1921 | 234 | 100.0 | ------- | ------- |
| 1927 | 2,521 | 83.9 | 3.4 | 12.7 |
| 1928 | 2,557 | 80.2 | 5.9 | 13.8 |
| Alameda, Calif.: | | | | |
| 1921 | 152 | 88.2 | 11.8 | ------- |
| 1927 | 239 | 81.2 | 5.4 | 13.4 |
| 1928 | 504 | 33.7 | .8 | 65.5 |
| Albany, N. Y.: | | | | |
| 1921 | 302 | 59.3 | 39.7 | 1.0 |
| 1927 | 558 | 48.9 | 44.6 | 6.5 |
| 1928 | 615 | 48.8 | 28.9 | 22.3 |
| Allentown, Pa.: | | | | |
| 1921 | 102 | 90.2 | 2.0 | 7.8 |
| 1927 | 681 | 74.9 | 1.9 | 23.1 |
| 1928 | 556 | 86.7 | 1.3 | 12.1 |
| Altoona, Pa.: | | | | |
| 1921 | 91 | 93.4 | 6.6 | ------- |
| 1927 | 282 | 92.6 | .4 | 7.1 |
| 1928 | 155 | 96.1 | 3.9 | ------- |
| Anderson, Ind.: | | | | |
| 1921 | 37 | 100.0 | ------- | ------- |
| 1927 | 456 | 72.4 | 1.5 | 26.1 |
| 1928 | 268 | 92.5 | 1.5 | 6.0 |
| Asheville, N. C.: | | | | |
| 1921 | 374 | 97.1 | 2.1 | .8 |
| 1927 | 449 | 70.4 | 1.1 | 28.5 |
| 1928 | 370 | 69.7 | 2.2 | 28.1 |
| Atlanta, Ga.: | | | | |
| 1921 | 1,614 | 78.1 | 3.3 | 18.6 |
| 1927 | 2,563 | 54.1 | 20.6 | 25.3 |
| 1928 | 3,170 | 41.6 | 14.2 | 44.2 |
| Atlantic City, N. J.: | | | | |
| 1921 | 366 | 51.9 | 27.9 | 20.2 |
| 1927 | 248 | 25.8 | 33.9 | 40.3 |
| 1928 | 57 | 64.9 | 19.3 | 15.8 |
| Augusta, Ga.: 1928 | 318 | 81.4 | 9.7 | 8.8 |
| Aurora, Ill.: | | | | |
| 1921 | 126 | 100.0 | ------- | ------- |
| 1927 | 418 | 85.7 | 1.9 | 12.4 |
| 1928 | 301 | 87.7 | 1.3 | 11.0 |
| Battle Creek, Mich.: | | | | |
| 1921 | 127 | 92.1 | 1.6 | 6.3 |
| 1927 | 268 | 91.8 | 5.2 | 3.0 |
| 1928 | 177 | 92.1 | 5.6 | 2.3 |
| Bayonne, N. J.: | | | | |
| 1921 | 274 | 56.9 | 28.1 | 15.0 |
| 1927 | 344 | 2.3 | 39.5 | 58.1 |
| 1928 | 436 | .7 | 19.0 | 80.3 |
| Beaumont, Tex.: | | | | |
| 1928 | 540 | 100.0 | ------- | ------- |
| Bellingham, Wash: | | | | |
| 1927 | 348 | 90.8 | ------- | 9.2 |
| 1928 | 264 | 94.3 | ------- | 5.7 |
| Berkeley, Calif.: | | | | |
| 1921 | 706 | 77.6 | 1.7 | 20.7 |
| 1927 | 867 | 65.6 | 8.1 | 26.3 |
| 1928 | 1,330 | 28.0 | 1.7 | 70.3 |
| Bethlehem, Pa.: | | | | |
| 1921 | 82 | 96.3 | 3.7 | ------- |
| 1927 | 230 | 35.7 | 46.1 | 18.3 |
| 1928 | 223 | 43.5 | 41.7 | 14.8 |
| Binghamton, N. Y.: | | | | |
| 1921 | 327 | 55.7 | 30.6 | 13.8 |
| 1927 | 310 | 31.6 | 32.3 | 36.1 |
| 1928 | 306 | 34.6 | 30.7 | 34.6 |
| Birmingham, Ala.: | | | | |
| 1921 | 1,659 | 93.7 | .5 | 5.7 |
| 1927 | 3,019 | 78.2 | 1.3 | 20.4 |
| 1928 | 2,589 | 70.2 | .8 | 29.0 |
| Bloomfield, N. J.: | | | | |
| 1928 | 675 | 42.7 | 29.2 | 28.1 |
| Bridgeport, Conn.: | | | | |
| 1921 | 404 | 35.6 | 32.7 | 31.7 |
| 1927 | 497 | 41.6 | 31.4 | 27.0 |
| 1928 | 388 | 44.6 | 27.3 | 28.1 |
| Brookline, Mass.: | | | | |
| 1921 | 118 | 22.0 | 54.2 | 23.7 |
| 1927 | 472 | 22.0 | 28.0 | 50.0 |
| 1928 | 556 | 21.2 | 14.4 | 64.4 |
| Cambridge, Mass.: | | | | |
| 1921 | 43 | 7.0 | 93.0 | ------- |
| 1927 | 636 | 5.5 | 33.7 | 60.9 |
| 1928 | 863 | 5.3 | 26.7 | 68.0 |
| Camden, N. J.: | | | | |
| 1921 | 145 | 100.0 | ------- | ------- |
| 1927 | 559 | 85.3 | 5.2 | 9.5 |
| 1928 | 350 | 87.7 | 12.3 | ------- |
| Canton, Ohio: | | | | |
| 1921 | 403 | 86.1 | 1.0 | 12.9 |
| 1927 | 512 | 90.0 | 2.2 | 7.8 |
| 1928 | 374 | 89.6 | 1.6 | 8.8 |
| Charleston, W. Va.: | | | | |
| 1921 | 712 | 77.7 | 6.0 | 16.4 |
| 1927 | 269 | 73.2 | 3.7 | 23.0 |
| 1928 | 258 | 83.7 | 7.0 | 9.3 |

[1] Includes 1-family and 2-family dwellings with stores.
[2] Includes multifamily dwellings with stores.

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000 IN SPECIFIED YEARS—Continued

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | 1-family dwellings | 2-family dwellings | Multi-family dwellings |
| Charlotte, N. C.: | | | | |
| 1921 | 322 | 93.2 | 3.1 | 3.7 |
| 1927 | 1,052 | 48.1 | 13.3 | 38.6 |
| 1928 | 1,237 | 47.9 | 13.7 | 38.3 |
| Chattanooga, Tenn.: | | | | |
| 1921 | 226 | 65.9 | 5.8 | 28.3 |
| 1927 | 596 | 56.9 | 8.7 | 34.4 |
| 1928 | 611 | 50.9 | 6.4 | 42.7 |
| Chester, Pa.: | | | | |
| 1921 | 47 | 91.5 | 8.5 | ------- |
| 1927 | 361 | 82.3 | 9.4 | 8.3 |
| 1928 | 243 | 92.6 | ------- | 7.4 |
| Cicero, Ill.: | | | | |
| 1921 | 453 | 57.8 | 40.8 | 1.3 |
| 1927 | 559 | 26.3 | 27.0 | 46.7 |
| 1928 | 464 | 23.3 | 12.9 | 63.8 |
| Cincinnati, Ohio: | | | | |
| 1921 | 1,161 | 92.9 | 1.3 | 5.8 |
| 1927 | 3,212 | 52.3 | 18.0 | 29.7 |
| 1928 | 3,559 | 51.2 | 10.1 | 38.8 |
| Clifton, N. J.: | | | | |
| 1921 | 540 | 39.8 | 58.2 | 2.0 |
| 1927 | 567 | 58.9 | 23.8 | 17.3 |
| 1928 | 547 | 43.9 | 26.9 | 29.3 |
| Columbia, S. C.: | | | | |
| 1928 | 272 | 82.4 | 14.7 | 2.9 |
| Columbus, Ga.: | | | | |
| 1921 | 88 | 68.2 | ------- | 31.8 |
| 1927 | 325 | 92.6 | ------- | 7.4 |
| 1928 | 321 | 100.0 | ------- | ------- |
| Columbus, Ohio: | | | | |
| 1921 | 1,317 | 65.8 | 31.7 | 2.5 |
| 1927 | 2,430 | 60.5 | 19.7 | 19.8 |
| 1928 | 2,477 | 58.1 | 12.1 | 29.9 |
| Covington, Ky.: | | | | |
| 1921 | 198 | 95.5 | 2.5 | 2.0 |
| 1927 | 346 | 81.5 | 13.9 | 4.6 |
| 1928 | 314 | 54.8 | 34.7 | 10.5 |
| Cranston, R. I.: | | | | |
| 1921 | 154 | 72.7 | 27.3 | ------- |
| 1927 | 452 | 79.2 | 18.8 | 2.0 |
| 1928 | 559 | 77.3 | 12.9 | 9.8 |
| Dallas, Tex.: | | | | |
| 1921 | 2,846 | 80.8 | 5.6 | 13.6 |
| 1927 | 986 | 67.1 | 27.0 | 5.9 |
| 1928 | 1,199 | 58.7 | 29.0 | 12.3 |
| Dayton, Ohio: | | | | |
| 1921 | 546 | 96.0 | 2.2 | 1.8 |
| 1927 | 1,201 | 43.8 | 37.3 | 18.9 |
| 1928 | 732 | 40.7 | 11.7 | 47.5 |
| Decatur, Ill.: | | | | |
| 1921 | 335 | 82.7 | 13.7 | 3.6 |
| 1927 | 613 | 96.1 | ------- | 3.9 |
| 1928 | 339 | 97.6 | ------- | 2.4 |
| Denver, Colo.: | | | | |
| 1921 | 1,624 | 87.8 | 4.8 | 7.4 |
| 1927 | 1,847 | 72.4 | 3.2 | 24.4 |
| 1928 | 1,869 | 60.8 | 3.9 | 35.4 |
| Des Moines, Iowa: | | | | |
| 1921 | 758 | 87.1 | 7.1 | 5.8 |
| 1927 | 360 | 86.7 | 2.2 | 11.1 |
| 1928 | 406 | 83.0 | 1.5 | 15.5 |
| Duluth, Minn.: | | | | |
| 1921 | 637 | 96.4 | 1.7 | 1.9 |
| 1927 | 303 | 95.0 | 2.0 | 3.0 |
| 1928 | 196 | 90.3 | 3.6 | 6.1 |
| Durham, N. C.: | | | | |
| 1927 | 508 | 81.1 | 9.1 | 9.8 |
| 1928 | 464 | 86.2 | 3.4 | 10.3 |
| East Chicago, Ind.: | | | | |
| 1921 | 168 | 57.1 | 31.0 | 11.9 |
| 1927 | 406 | 40.9 | 32.5 | 26.6 |
| 1928 | 204 | 28.9 | 19.6 | 51.5 |
| East Cleveland, Ohio: | | | | |
| 1921 | 472 | 13.1 | 39.8 | 47.0 |
| 1927 | 258 | 4.7 | 9.3 | 86.0 |
| 1928 | 136 | 10.3 | 1.5 | 88.2 |
| East Orange, N. J.: | | | | |
| 1921 | 376 | 26.6 | 38.6 | 34.8 |
| 1927 | 2,140 | 4.2 | 6.8 | 89.0 |
| 1928 | 968 | 3.9 | 8.7 | 87.4 |
| East Providence, R. I.: | | | | |
| 1927 | 249 | 79.9 | 17.7 | 2.4 |
| 1928 | 271 | 78.2 | 20.7 | 1.1 |
| East St. Louis, Ill.: | | | | |
| 1921 | 260 | 93.8 | ------- | 6.2 |
| 1927 | 585 | 66.8 | 12.3 | 20.9 |
| 1928 | 501 | 73.3 | 9.8 | 17.0 |
| Elgin, Ill.: | | | | |
| 1921 | 67 | 52.2 | 20.9 | 26.9 |
| 1927 | 262 | 93.5 | 2.3 | 4.2 |
| 1928 | 207 | 93.7 | 2.9 | 3.4 |
| Elizabeth, N. J.: | | | | |
| 1921 | 514 | 28.0 | 66.4 | 5.6 |
| 1927 | 1,650 | 12.4 | 13.4 | 74.2 |
| 1928 | 1,002 | 14.3 | 12.5 | 73.3 |
| El Paso, Tex.: | | | | |
| 1928 | 310 | 71.0 | 4.5 | 24.5 |
| Erie, Pa.: | | | | |
| 1921 | 518 | 62.5 | 37.5 | ------- |
| 1927 | 444 | 74.5 | 24.5 | .9 |
| 1928 | 397 | 80.6 | 17.4 | 2.0 |
| Evanston, Ill.: | | | | |
| 1921 | 415 | 74.0 | 5.8 | 20.2 |
| 1927 | 1,423 | 22.6 | 6.9 | 70.5 |
| 1928 | 945 | 20.7 | 3.7 | 75.6 |
| Evansville, Ind.: | | | | |
| 1921 | 509 | 84.3 | 2.4 | 13.4 |
| 1927 | 420 | 93.8 | 4.8 | 1.4 |
| 1928 | 420 | 91.2 | 5.2 | 3.6 |
| Everett, Mass.: | | | | |
| 1921 | 15 | 46.7 | 53.3 | ------- |
| 1927 | 440 | 13.9 | 69.1 | 17.0 |
| 1928 | 283 | 11.3 | 35.3 | 53.4 |
| Fall River, Mass.: | | | | |
| 1921 | 141 | 47.5 | 22.7 | 29.8 |
| 1927 | 251 | 54.6 | 29.5 | 15.8 |
| 1928 | 110 | 73.6 | 15.5 | 10.9 |
| Flint, Mich.: | | | | |
| 1921 | 348 | 61.8 | 33.0 | 5.2 |
| 1927 | 3,559 | 92.2 | 4.9 | 2.9 |
| 1928 | 2,221 | 75.7 | 16.7 | 7.6 |
| Fort Wayne, Ind.: | | | | |
| 1921 | 586 | 81.4 | 14.2 | 4.4 |
| 1927 | 485 | 98.4 | 1.6 | ------- |
| 1928 | 467 | 98.5 | .2 | 1.2 |
| Fort Worth, Tex.: | | | | |
| 1921 | 909 | 96.7 | ------- | 3.3 |
| 1927 | 3,160 | 55.5 | 22.0 | 22.5 |
| 1928 | 1,758 | 73.9 | 5.1 | 21.0 |
| Galveston, Tex.: | | | | |
| 1921 | 103 | 96.1 | ------- | 3.9 |
| 1927 | 571 | 96.7 | ------- | 3.3 |
| 1928 | 369 | 86.2 | 4.1 | 9.8 |

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000 IN SPECIFIED YEARS—Continued

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | 1-family dwellings | 2-family dwellings | Multi-family dwellings |
| Gary, Ind.: | | | | |
| 1921 | 494 | 59.1 | 0.4 | 40.5 |
| 1927 | 1,675 | 32.8 | 29.9 | 37.3 |
| 1928 | 890 | 67.4 | 9.2 | 23.4 |
| Grand Rapids, Mich.: | | | | |
| 1921 | 630 | 94.9 | 2.5 | 2.5 |
| 1927 | 1,709 | 95.2 | 3.3 | 1.4 |
| 1928 | 895 | 93.5 | 6.5 | ------- |
| Great Falls, Mont.: | | | | |
| 1928 | 260 | 52.7 | 6.5 | 40.8 |
| Greensboro, N. C.: | | | | |
| 1928 | 446 | 90.1 | 5.4 | 4.5 |
| Greenwich, Conn.: | | | | |
| 1928 | 344 | 68.9 | 13.1 | 18.0 |
| Hamilton, Ohio: | | | | |
| 1921 | 192 | 100.0 | ------- | ------- |
| 1927 | 362 | 100.0 | ------- | ------- |
| 1928 | 410 | 99.0 | ------- | 1.0 |
| Hammond, Ind.: | | | | |
| 1921 | 288 | 87.8 | 12.2 | ------- |
| 1927 | 1,141 | 60.5 | 6.0 | 33.6 |
| 1928 | 698 | 67.6 | 6.4 | 25.9 |
| Harrisburg, Pa.: | | | | |
| 1921 | 179 | 48.6 | 44.7 | 6.7 |
| 1927 | 319 | 98.7 | 1.3 | ------- |
| 1928 | 206 | 97.6 | 2.4 | ------- |
| Hartford, Conn.: | | | | |
| 1921 | 717 | 7.8 | 39.9 | 52.3 |
| 1927 | 1,270 | 11.0 | 21.7 | 67.2 |
| 1928 | 1,363 | 8.0 | 12.8 | 79.2 |
| Highland Park, Mich.: | | | | |
| 1921 | 250 | 13.2 | 15.2 | 71.6 |
| 1927 | 366 | .5 | 1.6 | 97.8 |
| 1928 | 117 | 2.6 | 1.7 | 95.7 |
| Holyoke, Mass.: | | | | |
| 1921 | 99 | 53.5 | 46.5 | ------- |
| 1927 | 275 | 14.2 | 11.6 | 74.2 |
| 1928 | 86 | 46.5 | 16.3 | 37.2 |
| Houston, Tex.: | | | | |
| 1921 | 2,572 | 88.9 | 3.4 | 7.7 |
| 1927 | 4,536 | 59.9 | 20.3 | 19.8 |
| 1928 | 4,463 | 63.5 | 21.7 | 14.8 |
| Indianapolis, Ind.: | | | | |
| 1921 | 2,565 | 56.1 | 21.4 | 22.5 |
| 1927 | 2,400 | 58.5 | 19.1 | 22.4 |
| 1928 | 2,511 | 52.0 | 14.3 | 33.7 |
| Irvington, N. J.: | | | | |
| 1921 | 389 | 38.8 | 39.3 | 21.9 |
| 1927 | 2,562 | 4.5 | 23.1 | 72.4 |
| 1928 | 1,022 | 3.9 | 11.2 | 84.9 |
| Jackson, Mich.: | | | | |
| 1921 | 108 | 87.0 | 3.7 | 9.3 |
| 1927 | 206 | 87.4 | 12.6 | ------- |
| 1928 | 250 | 93.6 | 6.4 | ------- |
| Jacksonville, Fla.: | | | | |
| 1921 | 747 | 75.8 | 9.9 | 14.3 |
| 1927 | 2,098 | 59.5 | 25.5 | 15.1 |
| 1928 | 1,658 | 60.1 | 17.2 | 22.6 |
| Jamestown, N. Y.: | | | | |
| 1922 | 161 | 94.4 | 3.7 | 1.9 |
| 1927 | 225 | 77.8 | 8.9 | 13.3 |
| 1928 | 169 | 94.7 | 5.3 | ------- |
| Jersey City, N. J.: | | | | |
| 1921 | 970 | 4.4 | 46.3 | 49.3 |
| 1927 | 1,287 | 1.9 | 25.8 | 72.3 |
| 1928 | 2,155 | .4 | 12.9 | 86.6 |
| Kansas City, Kans.: | | | | |
| 1921 | 395 | 100.0 | ------- | ------- |
| 1927 | 387 | 100.0 | ------- | ------- |
| 1928 | 321 | 89.4 | ------- | 10.6 |
| Kansas City, Mo.: | | | | |
| 1921 | 2,578 | 70.1 | 1.7 | 28.2 |
| 1927 | 3,104 | 33.1 | 2.3 | 64.6 |
| 1928 | 1,969 | 49.0 | 3.8 | 47.2 |
| Kearny, N. J.: | | | | |
| 1921 | 205 | 52.7 | 35.6 | 11.7 |
| 1927 | 696 | 31.5 | 35.3 | 33.2 |
| 1928 | 857 | 15.3 | 34.1 | 50.6 |
| Kenosha, Wis.: | | | | |
| 1921 | 128 | 82.8 | 14.1 | 3.1 |
| 1927 | 303 | 77.9 | 14.5 | 7.6 |
| 1928 | 295 | 90.2 | 7.5 | 2.4 |
| Knoxville, Tenn.: | | | | |
| 1921 | 489 | 98.8 | 1.2 | ------- |
| 1927 | 818 | 83.9 | .9 | 15.2 |
| 1928 | 940 | 77.2 | 6.4 | 16.4 |
| Lakewood, Ohio: | | | | |
| 1921 | 877 | 26.3 | 72.3 | 1.4 |
| 1927 | 582 | 22.0 | 18.9 | 59.1 |
| 1928 | 537 | 15.8 | 11.5 | 72.6 |
| Lancaster, Pa.: | | | | |
| 1921 | 73 | 76.7 | 19.2 | 4.1 |
| 1927 | 247 | 97.6 | 2.4 | ------- |
| 1928 | 154 | 100.0 | ------- | ------- |
| Lansing, Mich.: | | | | |
| 1921 | 492 | 93.7 | 3.9 | 2.4 |
| 1927 | 420 | 87.1 | 1.9 | 11.0 |
| 1928 | 443 | 99.1 | .9 | ------- |
| Lincoln, Nebr.: | | | | |
| 1921 | 241 | 97.5 | ------- | 2.5 |
| 1927 | 388 | 80.7 | ------- | 19.3 |
| 1928 | 497 | 62.6 | ------- | 37.4 |
| Little Rock, Ark.: | | | | |
| 1921 | 749 | 96.0 | 1.3 | 2.7 |
| 1927 | 514 | 83.9 | .4 | 15.8 |
| 1928 | 527 | 76.5 | ------- | 23.5 |
| Long Beach, Calif.: | | | | |
| 1921 | 3,882 | 33.2 | 7.3 | 59.5 |
| 1927 | 1,479 | 57.6 | 10.6 | 31.8 |
| 1928 | 3,099 | 41.9 | 14.9 | 43.2 |
| Lorain, Ohio: | | | | |
| 1921 | 146 | 87.7 | 6.8 | 5.5 |
| 1927 | 237 | 99.6 | .4 | ------- |
| 1928 | 227 | 100.0 | ------- | ------- |
| Louisville, Ky.: | | | | |
| 1921 | 677 | 88.9 | ------- | 11.1 |
| 1927 | 1,574 | 70.0 | 7.5 | 22.5 |
| 1928 | 1,542 | 54.9 | 10.6 | 34.5 |
| Lynn, Mass.: | | | | |
| 1921 | 140 | 57.1 | 12.9 | 30.0 |
| 1927 | 528 | 24.4 | 22.0 | 53.6 |
| 1928 | 501 | 26.9 | 24.0 | 49.1 |
| McKeesport, Pa.: | | | | |
| 1921 | 127 | 89.0 | 11.0 | ------- |
| 1927 | 246 | 90.7 | 4.1 | 5.3 |
| 1928 | 203 | 82.3 | 11.8 | 5.9 |
| Macon, Ga.: | | | | |
| 1921 | 162 | 95.1 | ------- | 4.9 |
| 1927 | 352 | 89.2 | .6 | 10.2 |
| 1928 | 321 | 98.1 | ------- | 1.9 |
| Madison, Wis.: | | | | |
| 1921 | 283 | 73.5 | 12.7 | 13.8 |
| 1927 | 489 | 79.8 | 3.9 | 16.4 |
| 1928 | 542 | 74.5 | 8.7 | 16.8 |

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000 IN SPECIFIED YEARS—Continued

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | 1-family dwellings | 2-family dwellings | Multi-family dwellings |
| Malden, Mass.: | | | | |
| 1921 | 94 | 40.4 | 27.7 | 31.9 |
| 1927 | 415 | 36.9 | 55.9 | 7.2 |
| 1928 | 718 | 18.4 | 12.0 | 69.6 |
| Medford, Mass.: | | | | |
| 1921 | 256 | 46.1 | 48.0 | 5.9 |
| 1927 | 628 | 53.7 | 42.8 | 3.5 |
| 1928 | 745 | 48.3 | 37.3 | 14.4 |
| Memphis, Tenn.: | | | | |
| 1921 | 1,245 | 75.3 | 2.4 | 22.2 |
| 1927 | 1,865 | 47.1 | 17.9 | 35.0 |
| 1928 | 1,887 | 41.4 | 19.1 | 39.5 |
| Meridan, Conn.: | | | | |
| 1921 | 71 | 26.7 | 43.7 | 29.6 |
| 1927 | 211 | 82.0 | 5.2 | 12.8 |
| 1928 | 137 | 88.3 | 7.3 | 4.4 |
| Miami, Fla.: | | | | |
| 1922 | 959 | 85.9 | ------- | 14.1 |
| 1927 | 698 | 83.2 | 5.7 | 11.0 |
| 1928 | 124 | 97.6 | ------- | 2.4 |
| Minneapolis, Minn.: | | | | |
| 1921 | 3,574 | 75.9 | 5.2 | 18.9 |
| 1927 | 2,189 | 65.2 | 11.8 | 23.0 |
| 1928 | 2,240 | 57.1 | 11.6 | 31.3 |
| Mobile, Ala.: | | | | |
| 1928 | 638 | 92.3 | 1.3 | 6.4 |
| Montclair, N. J.: | | | | |
| 1921 | 276 | 65.9 | 9.4 | 24.7 |
| 1927 | 334 | 51.8 | 32.6 | 15.6 |
| 1928 | 323 | 54.2 | 17.3 | 28.5 |
| Montgomery, Ala.: | | | | |
| 1928 | 726 | 91.2 | .8 | 8.0 |
| Mount Vernon, N. Y.: | | | | |
| 1921 | 246 | 66.3 | 16.3 | 17.4 |
| 1927 | 2,211 | 10.9 | 5.4 | 83.7 |
| 1928 | 1,636 | 18.5 | 4.5 | 77.0 |
| Muncie, Ind.: | | | | |
| 1921 | 64 | 75.0 | 12.5 | 12.5 |
| 1927 | 317 | 94.6 | ------- | 5.4 |
| 1928 | 371 | 90.8 | .3 | 8.9 |
| Nashville, Tenn.: | | | | |
| 1921 | 470 | 89.8 | ------- | 10.2 |
| 1927 | 654 | 82.7 | 1.5 | 15.7 |
| 1928 | 753 | 71.3 | 11.2 | 17.5 |
| Newark, N. J.: | | | | |
| 1921 | 1,393 | 19.1 | 49.1 | 31.8 |
| 1927 | 5,144 | 3.5 | 16.2 | 80.3 |
| 1928 | 3,288 | 2.3 | 12.9 | 84.8 |
| New Britain, Conn.: | | | | |
| 1921 | 215 | 20.0 | 38.1 | 41.9 |
| 1927 | 537 | 28.7 | 30.2 | 41.2 |
| 1928 | 327 | 39.1 | 33.0 | 27.8 |
| New Brunswick, N. J.: | | | | |
| 1921 | 129 | 25.6 | 71.3 | 3.1 |
| 1927 | 195 | 36.9 | 46.2 | 16.9 |
| 1928 | 210 | 48.6 | 12.4 | 39.0 |
| New Haven, Conn.: | | | | |
| 1921 | 444 | 21.2 | 40.1 | 38.7 |
| 1927 | 497 | 24.3 | 7.2 | 68.4 |
| 1928 | 546 | 23.3 | 8.4 | 68.3 |
| New London, Conn.: | | | | |
| 1928 | 218 | 46.8 | 21.1 | 32.1 |
| New Orleans, La.: | | | | |
| 1921 | 2,335 | 41.8 | 47.2 | 11.0 |
| 1927 | 2,077 | 24.6 | 64.7 | 10.8 |
| 1928 | 2,107 | 20.7 | 72.9 | 6.3 |
| New Rochelle, N. Y.: | | | | |
| 1921 | 247 | 74.9 | 17.8 | 7.3 |
| 1927 | 1,049 | 26.1 | 5.2 | 68.6 |
| 1928 | 1,305 | 22.9 | 2.3 | 74.8 |
| Newton, Mass.: | | | | |
| 1921 | 249 | 83.5 | 15.3 | 1.2 |
| 1927 | 734 | 68.4 | 31.6 | ------- |
| 1928 | 939 | 61.2 | 38.8 | ------- |
| Niagara Falls, N. Y.: | | | | |
| 1921 | 286 | 56.3 | 37.1 | 6.6 |
| 1927 | 397 | 68.3 | 26.4 | 5.3 |
| 1928 | 506 | 69.2 | 22.9 | 7.9 |
| Norfolk, Va.: | | | | |
| 1921 | 419 | 69.2 | 17.2 | 13.6 |
| 1927 | 496 | 63.9 | 2.0 | 34.1 |
| 1928 | 634 | 43.8 | .9 | 55.2 |
| Norwalk, Conn.: | | | | |
| 1921 | 72 | 83.3 | 16.7 | ------- |
| 1927 | 285 | 77.5 | 10.5 | 11.9 |
| 1928 | 358 | 69.3 | 13.1 | 17.6 |
| Oakland, Calif.: | | | | |
| 1921 | 2,681 | 77.9 | 4.3 | 17.8 |
| 1927 | 2,694 | 57.1 | 4.1 | 38.8 |
| 1928 | 2,430 | 41.6 | 2.2 | 56.1 |
| Oak Park, Ill.: | | | | |
| 1921 | 720 | 70.3 | 4.7 | 25.0 |
| 1927 | 918 | 22.7 | .3 | 77.0 |
| 1928 | 745 | 25.9 | .7 | 73.4 |
| Ogden, Utah: | | | | |
| 1921 | 477 | 91.2 | ------- | 8.8 |
| 1927 | 200 | 89.5 | ------- | 10.5 |
| 1928 | 157 | 88.5 | 2.5 | 8.9 |
| Oklahoma City, Okla.: | | | | |
| 1921 | 1,724 | 83.8 | 2.2 | 13.9 |
| 1927 | 1,752 | 66.4 | 15.1 | 18.4 |
| 1928 | 2,637 | 76.9 | 6.4 | 16.7 |
| Omaha, Nebr.: | | | | |
| 1921 | 1,298 | 76.1 | .6 | 23.3 |
| 1927 | 477 | 70.9 | 2.9 | 26.2 |
| 1928 | 412 | 82.3 | 4.4 | 13.3 |
| Orange, N. J.: | | | | |
| 1921 | 55 | 25.5 | 52.7 | 21.8 |
| 1927 | 722 | 6.8 | 6.4 | 86.8 |
| 1928 | 281 | 6.8 | 24.2 | 69.0 |
| Pasadena, Calif.: | | | | |
| 1921 | 1,262 | 85.9 | 2.2 | 11.9 |
| 1927 | 790 | 57.8 | 5.3 | 36.8 |
| 1928 | 600 | 58.3 | 10.5 | 31.2 |
| Passaic, N. J.: | | | | |
| 1921 | 426 | 16.4 | 60.1 | 23.5 |
| 1927 | 467 | 11.6 | 15.0 | 73.4 |
| 1928 | 351 | 18.8 | 11.1 | 70.1 |
| Paterson, N. J.: | | | | |
| 1921 | 587 | 39.2 | 54.5 | 6.3 |
| 1927 | 1,167 | 19.2 | 19.6 | 61.2 |
| 1928 | 748 | 23.4 | 20.9 | 55.7 |
| Pawtucket, R. I.: | | | | |
| 1921 | 277 | 45.8 | 32.5 | 21.7 |
| 1927 | 581 | 46.3 | 47.8 | 5.8 |
| 1928 | 455 | 63.5 | 29.9 | 6.6 |
| Peoria, Ill.: | | | | |
| 1921 | 300 | 82.0 | 12.7 | 5.3 |
| 1927 | 349 | 93.1 | 1.7 | 5.2 |
| 1928 | 437 | 82.4 | .7 | 16.9 |
| Phoenix, Ariz.: | | | | |
| 1921 | 407 | 73.9 | ------- | 26.1 |
| 1927 | 614 | 66.0 | 26.7 | 7.3 |
| 1928 | 748 | 69.5 | 17.6 | 12.8 |
| Pittsfield, Mass.: | | | | |
| 1921 | 43 | 95.3 | 4.7 | ------- |
| 1927 | 118 | 61.0 | 29.7 | 9.3 |
| 1928 | 211 | 65.9 | 15.2 | 19.0 |
| Plainfield, N. J.: | | | | |
| 1921 | 135 | 100.0 | ------- | ------- |
| 1927 | 507 | 49.3 | 8.9 | 41.8 |
| 1928 | 311 | 73.6 | 14.5 | 11.9 |

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000 IN SPECIFIED YEARS—Continued

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | 1-family dwellings | 2-family dwellings | Multi-family dwellings |
| Pontiac, Mich.: | | | | |
| 1921 | 60 | 96.7 | 3.3 | ------- |
| 1927 | 1,069 | 55.2 | 12.0 | 32.8 |
| 1928 | 1,735 | 69.2 | 7.7 | 23.1 |
| Port Arthur, Tex.: | | | | |
| 1927 | 508 | 100.0 | ------- | ------- |
| 1928 | 210 | 100.0 | ------- | ------- |
| Portland, Me.: | | | | |
| 1921 | 207 | 78.3 | .5 | 21.3 |
| 1927 | 216 | 68.1 | 3.7 | 28.2 |
| 1928 | 261 | 62.1 | 2.7 | 35.2 |
| Portland, Oreg.: | | | | |
| 1921 | 3,136 | 91.4 | 2.6 | 6.1 |
| 1927 | 3,166 | 71.0 | 3.2 | 25.9 |
| 1928 | 2,321 | 69.1 | 3.4 | 27.6 |
| Portsmouth, Ohio: | | | | |
| 1921 | 113 | 91.2 | .9 | 8.0 |
| 1927 | 224 | 95.1 | 3.6 | 1.3 |
| 1928 | 169 | 95.3 | 1.2 | 3.6 |
| Providence, R. I.: | | | | |
| 1921 | 566 | 33.9 | 51.2 | 14.8 |
| 1927 | 1,188 | 37.4 | 37.3 | 25.3 |
| 1928 | 1,134 | 42.2 | 31.7 | 26.1 |
| Pueblo, Colo.: | | | | |
| 1921 | 288 | 98.6 | ------- | 1.4 |
| 1927 | 401 | 89.3 | 10.7 | ------- |
| 1928 | 372 | 79.0 | 17.5 | 3.5 |
| Quincy, Mass.: | | | | |
| 1921 | 404 | 57.2 | 34.4 | 8.4 |
| 1927 | 926 | 52.8 | 16.6 | 30.6 |
| 1928 | 977 | 46.4 | 14.3 | 39.3 |
| Racine, Wis.: | | | | |
| 1921 | 169 | 77.5 | 15.4 | 7.1 |
| 1927 | 609 | 62.7 | 19.0 | 18.2 |
| 1928 | 681 | 43.2 | 33.2 | 23.6 |
| Reading, Pa.: | | | | |
| 1922 | 333 | 56.2 | 27.0 | 16.8 |
| 1927 | 233 | 82.4 | 3.4 | 14.2 |
| 1928 | 263 | 97.3 | 2.7 | ------- |
| Revere, Mass.: | | | | |
| 1921 | 152 | 69.7 | 30.3 | ------- |
| 1927 | 241 | 50.2 | 38.2 | 11.6 |
| 1928 | 247 | 53.8 | 38.1 | 8.1 |
| Richmond, Ind.: | | | | |
| 1921 | 41 | 58.5 | 41.5 | ------- |
| 1927 | 228 | 100.0 | ------- | ------- |
| 1928 | 153 | 100.0 | ------- | ------- |
| Richmond, Va.: | | | | |
| 1921 | 741 | 78.1 | ------- | 21.9 |
| 1927 | 1,774 | 44.9 | 9.4 | 45.7 |
| 1928 | 764 | 63.4 | 9.4 | 27.2 |
| Roanoke, Va.: | | | | |
| 1921 | 351 | 100.0 | ------- | ------- |
| 1927 | 395 | 90.9 | ------- | 9.1 |
| 1928 | 364 | 56.0 | 13.7 | 30.2 |
| Rochester, N. Y.: | | | | |
| 1921 | 1,319 | 72.1 | 17.1 | 10.8 |
| 1927 | 2,448 | 50.4 | 8.1 | 41.5 |
| 1928 | 1,862 | 46.1 | 6.8 | 47.2 |
| Rockford, Ill.: | | | | |
| 1921 | 351 | 68.7 | 16.5 | 14.8 |
| 1927 | 926 | 55.7 | 22.2 | 22.0 |
| 1928 | 779 | 54.6 | 17.5 | 28.0 |
| Sacramento, Calif.: | | | | |
| 1921 | 737 | 84.0 | 4.6 | 11.4 |
| 1927 | 959 | 82.7 | 5.0 | 12.3 |
| 1928 | 917 | 74.4 | 12.3 | 13.3 |
| Saginaw, Mich.: | | | | |
| 1921 | 251 | 96.8 | 1.6 | 1.6 |
| 1927 | 347 | 98.8 | 1.2 | ------- |
| 1928 | 577 | 90.5 | 2.6 | 6.9 |
| St. Paul, Minn.: | | | | |
| 1921 | 2,194 | 78.6 | 4.6 | 16.8 |
| 1927 | 1,148 | 72.0 | 7.0 | 21.0 |
| 1928 | 773 | 86.3 | 6.7 | 7.0 |
| St. Petersburg, Fla.: | | | | |
| 1927 | 442 | 84.2 | 7.0 | 8.8 |
| 1928 | 172 | 98.8 | 1.2 | ------- |
| Salt Lake City, Utah: | | | | |
| 1921 | 826 | 90.0 | 3.8 | 6.2 |
| 1927 | 850 | 56.1 | 8.0 | 35.9 |
| 1928 | 731 | 52.7 | 15.0 | 32.3 |
| San Antonio, Tex.: | | | | |
| 1921 | 1,718 | 95.5 | ------- | 4.5 |
| 1927 | 2,171 | 79.6 | 3.7 | 16.7 |
| 1928 | 2,784 | 70.8 | 6.1 | 23.1 |
| San Diego, Calif.: | | | | |
| 1921 | 1,450 | 88.6 | .3 | 11.1 |
| 1927 | 2,613 | 76.8 | 7.6 | 15.6 |
| 1928 | 2,146 | 73.6 | 3.7 | 22.7 |
| San Jose, Calif.: | | | | |
| 1921 | 300 | 83.7 | 3.6 | 12.7 |
| 1927 | 385 | 73.0 | 10.4 | 16.6 |
| 1928 | 370 | 67.0 | 5.9 | 27.0 |
| Savannah, Ga.: | | | | |
| 1921 | 347 | 81.0 | ------- | 19.0 |
| 1927 | 401 | 72.6 | 15.0 | 12.5 |
| 1928 | 430 | 59.1 | 15.8 | 25.1 |
| Schenectady, N. Y.: | | | | |
| 1921 | 193 | 70.0 | 30.0 | ------- |
| 1927 | 349 | 71.3 | 9.7 | 18.9 |
| 1928 | 209 | 89.2 | 9.7 | 1.1 |
| Scranton, Pa.: | | | | |
| 1921 | 75 | 81.3 | 18.7 | ------- |
| 1927 | 280 | 57.1 | 42.9 | ------- |
| 1928 | 292 | 51.7 | 13.7 | 34.6 |
| Seattle, Wash.: | | | | |
| 1921 | 1,961 | 90.5 | ------- | 9.5 |
| 1927 | 4,505 | 61.0 | ------- | 39.0 |
| 1928 | 4,658 | 50.1 | .6 | 49.4 |
| Sheboygan, Wis.: | | | | |
| 1921 | 90 | 95.6 | 4.4 | ------- |
| 1927 | 204 | 88.2 | 11.8 | ------- |
| 1928 | 188 | 82.4 | 16.0 | 1.6 |
| Shreveport, La.: | | | | |
| 1921 | 1,157 | 100.0 | ------- | ------- |
| 1927 | 185 | 66.5 | 15.1 | 18.4 |
| 1928 | 713 | 70.5 | 11.5 | 18.0 |
| Sioux City, Iowa: | | | | |
| 1921 | 638 | 90.4 | 5.0 | 4.5 |
| 1927 | 267 | 72.7 | ------- | 27.3 |
| 1928 | 282 | 69.9 | 3.5 | 26.6 |
| Sioux Falls, S. D.: | | | | |
| 1921 | 303 | 100.0 | ------- | ------- |
| 1927 | 151 | 84.8 | 7.3 | 7.9 |
| 1928 | 211 | 71.6 | 28.4 | ------- |
| Somerville, Mass.: | | | | |
| 1921 | 204 | 5.4 | 75.5 | 19.1 |
| 1927 | 399 | 1.0 | 54.1 | 44.9 |
| 1928 | 199 | 1.0 | 64.3 | 34.7 |
| South Bend, Ind.: | | | | |
| 1921 | 665 | 78.0 | 13.8 | 8.1 |
| 1927 | 540 | 96.3 | 2.6 | 1.1 |
| 1928 | 579 | 95.9 | 2.1 | 2.1 |
| Spokane, Wash.: | | | | |
| 1921 | 438 | 98.7 | ------- | 1.3 |
| 1927 | 595 | 85.2 | .5 | 14.3 |
| 1928 | 574 | 82.8 | 1.4 | 15.9 |
| Springfield, Ill.: | | | | |
| 1921 | 210 | 76.7 | 6.7 | 16.6 |
| 1927 | 354 | 92.7 | 3.1 | 4.2 |
| 1928 | 352 | 81.0 | 2.8 | 16.2 |

TABLE 3.—PER CENT OF FAMILIES PROVIDED FOR BY THE DIFFERENT KINDS OF DWELLINGS IN CITIES HAVING A POPULATION OF FROM 25,000 TO 500,000 IN SPECIFIED YEARS—Continued

| City, State, and year | Total number of families provided for | Per cent of families provided for in— | | |
|---|---|---|---|---|
| | | 1-family dwellings | 2-family dwellings | Multi-family dwellings |
| Springfield, Mass.: | | | | |
| 1921 | 827 | 59.9 | 30.0 | 10.2 |
| 1927 | 1,240 | 36.5 | 18.2 | 45.2 |
| 1928 | 647 | 63.8 | 13.9 | 22.3 |
| Springfield, Mo.: | | | | |
| 1928 | 305 | 87.9 | 1.6 | 10.5 |
| Springfield, Ohio: | | | | |
| 1921 | 253 | 90.9 | 9.1 | ------- |
| 1927 | 285 | 84.9 | 15.1 | ------- |
| 1928 | 315 | 79.7 | 15.2 | 5.1 |
| Stamford, Conn.: | | | | |
| 1921 | 190 | 50.5 | 34.7 | 14.7 |
| 1927 | 559 | 30.6 | 21.8 | 47.6 |
| 1928 | 331 | 60.4 | 27.8 | 11.8 |
| Stockton, Calif.: | | | | |
| 1921 | 624 | 66.8 | ------- | 33.2 |
| 1927 | 412 | 70.9 | 2.9 | 26.2 |
| 1928 | 226 | 86.3 | 4.4 | 9.3 |
| Syracuse, N. Y.: | | | | |
| 1921 | 627 | 55.5 | 38.8 | 5.7 |
| 1927 | 1,838 | 53.0 | 16.5 | 30.5 |
| 1928 | 1,561 | 53.1 | 14.8 | 32.1 |
| Tacoma, Wash.: | | | | |
| 1921 | 843 | 93.1 | ------- | 6.9 |
| 1927 | 769 | 80.5 | ------- | 19.5 |
| 1928 | 822 | 65.9 | ------- | 34.1 |
| Tampa, Fla.: | | | | |
| 1922 | 422 | 89.3 | 5.2 | 5.5 |
| 1927 | 826 | 94.8 | 1.1 | 4.1 |
| 1928 | 647 | 93.0 | 1.7 | 5.3 |
| Toledo, Ohio: | | | | |
| 1921 | 600 | 80.3 | 15.7 | 4.0 |
| 1927 | 1,749 | 81.0 | 8.3 | 10.6 |
| 1928 | 1,698 | 68.0 | 10.5 | 21.4 |
| Topeka, Kans.: | | | | |
| 1921 | 188 | 84.0 | ------- | 16.0 |
| 1927 | 320 | 87.5 | ------- | 12.5 |
| 1928 | 304 | 75.7 | .7 | 23.7 |
| Trenton, N. J.: | | | | |
| 1921 | 317 | 89.3 | ------- | 10.7 |
| 1927 | 316 | 96.2 | 1.9 | 1.9 |
| 1928 | 223 | 77.6 | ------- | 22.4 |
| Tucson, Ariz.: | | | | |
| 1927 | 535 | 54.2 | 7.5 | 38.3 |
| 1928 | 336 | 91.7 | 6.0 | 2.4 |
| Tulsa, Okla.: | | | | |
| 1921 | 1,138 | 77.5 | 5.1 | 17.4 |
| 1927 | 1,434 | 68.1 | 13.9 | 18.1 |
| 1928 | 2,187 | 48.0 | 21.8 | 30.3 |
| Union City, N. J.: | | | | |
| 1921 | 56 | 33.9 | 14.3 | 51.8 |
| 1927 | 255 | ------- | 12.5 | 87.5 |
| 1928 | 84 | 3.6 | 9.5 | 86.9 |
| Utica, N. Y.: | | | | |
| 1921 | 478 | 43.3 | 56.7 | ------- |
| 1927 | 259 | 83.4 | 16.6 | ------- |
| 1928 | 342 | 59.9 | 8.2 | 31.9 |
| Waltham, Mass.: | | | | |
| 1921 | 137 | 92.7 | 4.4 | 2.9 |
| 1927 | 285 | 49.1 | 30.5 | 20.4 |
| 1928 | 362 | 48.9 | 25.4 | 25.7 |
| Warren, Ohio: | | | | |
| 1921 | 171 | 94.7 | 5.3 | ------- |
| 1927 | 321 | 95.3 | 4.7 | ------- |
| 1928 | 306 | 95.4 | 2.6 | 2.0 |
| Waterbury, Conn.: | | | | |
| 1921 | 271 | 43.2 | 22.9 | 33.9 |
| 1927 | 675 | 54.4 | 20.7 | 24.9 |
| 1928 | 504 | 44.6 | 19.0 | 36.3 |
| Waterloo, Iowa: | | | | |
| 1928 | 270 | 98.5 | ------- | 1.5 |
| Watertown, Mass: | | | | |
| 1927 | 759 | 14.1 | 85.9 | ------- |
| 1928 | 454 | 17.6 | 82.4 | ------- |
| West New York, N. J.: | | | | |
| 1921 | 269 | 6.3 | 62.5 | 31.2 |
| 1927 | 283 | 8.5 | 3.5 | 88.0 |
| 1928 | 170 | 1.2 | 12.4 | 86.5 |
| White Plains, N. Y.: | | | | |
| 1927 | 1,204 | 22.5 | 3.8 | 73.7 |
| 1928 | 856 | 34.8 | 1.9 | 63.3 |
| Wichita, Kans.: | | | | |
| 1921 | 1,336 | 93.2 | 2.8 | 4.0 |
| 1927 | 988 | 77.7 | 4.9 | 17.4 |
| 1928 | 1,207 | 73.1 | 7.4 | 19.6 |
| Wichita Falls, Tex.: | | | | |
| 1927 | 548 | 90.5 | 5.8 | 3.7 |
| 1928 | 222 | 89.2 | 5.4 | 5.4 |
| Wilkes-Barre, Pa.: | | | | |
| 1921 | 82 | 91.5 | 4.9 | 3.6 |
| 1927 | 230 | 64.8 | 25.2 | 10.0 |
| 1928 | 174 | 52.3 | 24.1 | 23.6 |
| Wilmington, Del.: | | | | |
| 1921 | 66 | 71.2 | 7.6 | 21.2 |
| 1927 | 366 | 83.1 | .5 | 16.4 |
| 1928 | 365 | 88.5 | .8 | 10.7 |
| Winston-Salem, N. C.: | | | | |
| 1921 | 356 | 94.1 | .6 | 5.3 |
| 1927 | 923 | 74.8 | 2.6 | 22.6 |
| 1928 | 965 | 63.8 | 5.9 | 30.3 |
| Worcester, Mass.: | | | | |
| 1921 | 715 | 67.0 | 17.8 | 15.2 |
| 1927 | 795 | 59.0 | 18.6 | 22.4 |
| 1928 | 474 | 68.4 | 16.5 | 15.2 |
| Yonkers, N. Y.: | | | | |
| 1921 | 433 | 76.0 | ------- | 24.0 |
| 1927 | 4,146 | 14.3 | 6.7 | 79.1 |
| 1928 | 4,216 | 14.8 | 4.9 | 80.3 |
| Youngstown, Ohio: | | | | |
| 1921 | 724 | 62.2 | 20.7 | 17.1 |
| 1927 | 1,148 | 80.8 | 11.8 | 7.3 |
| 1928 | 929 | 83.6 | 10.2 | 6.1 |

# LABOR CONVENTIONS AND CONFERENCES

## Eleventh Convention of the National Women's Trade-Union League

THE eleventh convention of the National Women's Trade-Union League of America was held in Washington, D. C., May 6–11, 1929. A large part of the discussion centered around labor conditions in the new industrial South. A symposium on wages was also an important feature of the congress.

### Southern Labor Problems

AT THE opening session Miss Rose Schneiderman, the national president, stated:

> From self-interest alone, if from no loftier motive, the working women of the North must do all in their power to help their brothers and sisters in the South, for unless they do so speedily, they are in serious danger of losing their hard-won standards of hours and wages.

William Green, the president of the American Federation of Labor, denounced the show of troops and guns in connection with the strikes of the textile workers in Elizabethton, Tenn., declaring such show of military force was "one of the things which lie at the bottom of the so-called radical movements in our country."

Mr. Green also said:

> We are trying to reduce the hours of labor of working men and women and to usher in the 5-day week for the enjoyment of all, and to develop our wage standard to a high point. I am glad indeed that we find most of the outstanding economists of the country that share our point of view, because they are coming to realize more and more than ever that the prosperity of our great Nation depends upon the development of the purchasing power of the masses of the people to a high and still higher point.

The delegates unanimously authorized the sending of a telegram from the league in convention assembled and from each organization there represented to the Governor of Tennessee protesting against "the use of State troops in industrial disputes and most emphatically in the case of the rayon workers at Elizabethton."

Miss Matilda Lindsay, the southern field representative of the league, submitted her report on that organization's activities in the Southern States. Her recommendations to the convention were as follows:

> (1) That we continue to work in cooperation with the organizations in the community, especially the church groups and the women's organizations in order to bring them into closer contact with industrial problems; (2) that we continue our plan of cooperative action with the organized labor movement, especially in places where we are already working such as Greensboro, N. C.; (3) that we work out a plan of work with the executive board of the Tennessee Federation of Labor looking toward doing intensive work in that State; (4) that we work for the establishment of workers' classes wherever possible; (5) that we plan for more joint meetings with the women's organizations interested in industrial subjects; (6) that we continue our monthly news letter; and (7) that we cooperate with the United Textile Workers in their work in the South. These recommendations are all along the lines we are now working.

A separate recommendation was made that the league "plan for an intensive membership drive among southern people."

On the morning of May 9 Miss Margaret Bowen, secretary-treasurer of the recently formed local of the United Textile Workers in Elizabethton, Tenn., reported on conditions in the rayon mills of that town.

The following excerpt is taken from the summary of the proceedings:

> The strike was in general protest against the fact that the average wage of the rayon workers was $9.20 a week; the wages of the 75 per cent of woman workers was lower, Miss Bowen told the delegates. Out of this had to be paid a minimum rent of $5 a week for the "shacks" owned by the company and operated as real estate ventures; a dollar a week transportation charges from the town where the workers all live to the factories located some distance outside of the town; and the expenses of food, clothing, and laundry. After the first strike occurred in March, increases were granted to some of the workers' groups; but unjust discriminations in these increases, the fact that girls returning to work were fired for such "offenses" as fainting, or powdering their noses, and the unscrupulous methods adopted by the employers to induce strikers to return to work and desert the union, soon led to the second strike which is still on, although the two factories have resumed operations.

According to the league's southern field representative, men in the Elizabethton mills "had been working for $12 a week, paying exorbitant rents for small shacks owned by the employers, and trying to support their families on the bare level of subsistence." She said that in many southern States cheap labor is held out as an attraction to northern manufacturers. The workers, however, "are realizing that it is their constitutional right to belong to a union."

Miss Mary Anderson, the chief of the United States Women's Bureau, who presided at the forum on the southern industrial situation, spoke of the "tremendous labor unrest in the South," and declared that "what southern labor needs above all else is organization."

In her address on "The human side of the new industrial South," Mrs. Raymond Robins, honorary president of the league, insisted that the southern problem is more "social and human" than industrial and is a part of the whole problem of rural communities in this country.

> Some of our great women leaders should go to live in the small rural communities of the South to inspire local people to deal themselves with problems of health, sanitation, and education. Leaders interested in southern problems should know their communities intimately. Let me suggest that the league send its leaders into these rural communities, not for a day, not for a month or two, but for a settled effort to call forth local leadership.

Further on in her address Mrs. Robins said:

> No standard of labor conditions is secure until it is general throughout the country. Wherever conditions in industry are wrong, the answer is trade-union organization. The chief social gain of the union shop is not only better wages and shorter hours, but rather the incentive it offers for initiative and social leadership. In the final analysis the greatest value of the trade-union movement lies in the fact that it calls forth personality.

The southern situation is a challenge "to the effort of those who oppose the 60-hour week for small children and starvation wages for women," Mr. Frank Morrison, secretary of the American Federation of Labor asserted.

In the judgment of Luther Steward, president of the Federal Employees' Union, "the South offers the greatest opportunity of the next few years for trade-union organization, but presents great problems because of the diversified character of the inhabitants of different States and because of the complications of religious and racial prejudice."

Among other subjects on the program of this session were Industrial problems of the South and their meaning for the community; The South at the turning of the ways; and Winning the South to trade-unionism. This last-mentioned subject was discussed by Mr. T. A. Wilson, president of the North Carolina Federation of Labor, who attributed the present labor unrest in the South in part to the development of education in that section of the country and to the institution by employers of the "stretch-out" wage system.

He also said:

> People of North Carolina are realizing now the real constructive character of the American Federation of Labor and the United Textile Workers of America. These organizations were once falsely considered communistic and radical. The employers' only alternative to accepting the American Federation of Labor is to force their employees into radical revolt.

## Interest of the Young Women's Christian Association

At the May 10 session a fraternal delegate of the Young Women's Christian Association stated that that body was tremendously interested in the southern problem.

> At a meeting of the national board a week ago a resolution was adopted in which was set forth the organization's position with regard to the attempts now being made to organize the trade-unions in the South, and this resolution was sent to the southern associations for their approval. She said that more and more the industrial department was coming to realize that its job was not only concerned with industrial women and girls, but also in helping to educate the community to a place where it is willing and anxious to have organizations like the National Women's Trade-Union League come in with their splendid activities.

## Wage Symposium

Both the morning and the afternoon of the third day of the convention were given over to a symposium on wages. It was suggested at the outset by Miss Lillian Herstein, the director of discussion, that it was not expected that the delegates should then and there arrive at final conclusions on the knotty problems before them. The object of the symposium was rather to stimulate thought and to suggest subjects for study which might be carried on by workers' classes under the auspices of local leagues.

Out of 26 challenging questions or statements frequently heard in reference to women's wages and listed on the memorandum for discussion the attention of the delegates was directed especially to the following:

1. In what direction are wages moving?
2. Have money wages per hour been rising or falling?
3. Are workers in general better off now than they were five years ago?
4. Are woman workers better off now than they were five years ago?
5. Women should not get as high wages as men because they live at home.
6. Women not living at home should not get as high wages as men because their expenses are less.
7. Women should not get as high wages as men because they do not usually have families to support.

8. An unmarried woman should be the last to be hired and the first to be fired when competing with men for the same reason that a married woman should be the last to be hired and the first to be fired when competing with unmarried women.

Among the speakers were women in the textile, shoe, garment, neckwear, and telephone industries. There was general agreement that official figures on weekly wages compiled from pay rolls do not accurately picture the workers' real annual incomes.

Miss Ethel M. Smith, chairman of the committee on legislation, summarized a report on wage trends which had been compiled by the National Women's Trade-Union League under the direction of leading economists.

The contrast between wages of men and women doing the same work was stressed by the leader of the discussion, who declared that one of the great labor problems of the future is the fact that "while the majority of women are in industry because of necessity, many are entering because they want to turn spare time into cash and are willing to work for low wages."

One of the principal factors in the present unemployment situation, Miss Herstein said, "is the development of new machinery and efficiency methods, which enables one worker to do the job of two."

By way of illustration, Mrs. Julia O'Connor Parker, president of the Telephone Operators' Branch of the International Brotherhood of Electrical Workers, cited the installation of automatic telephone exchanges, which is throwing many woman switchboard operators out of jobs, particularly in small towns. A typical instance was the reduction of the number of girl telephone operators in Terre Haute, Ind., from 184 to 18 by the installation of the automatic system. It was reported that the wages of telephone operators had not been increased for the past five years. Women have been willing to go into the industry for low wages because they thought the employment was steady and secure.

It was suggested by Miss Rose Schneiderman, president of the league, that the trade-unions should take up the matter of employers' guaranteeing the workers a certain stability and continuity of employment. This suggestion raised the question as to how employers could do this unless they themselves were guaranteed a market.

In the judgment of Mrs. Sarah Green, representative of the National Waitresses' Union, the increasing demand by employers for young and personable woman workers is creating a serious situation for older women who are obliged to work for their living. "It is almost impossible," she said, "for a waitress who weighs over 125 pounds and is over 30 years of age to get a job. Child's restaurants in New York City will not employ a girl who is over 25 years' old. What is going to happen to the rest of us?"

The competition of teachers and students who have recourse temporarily to jobs in the hotel and restaurant industry was scored by some of the delegates representing that industry.

Rapid changes in styles result in uncertain markets and instability of employment in the clothing industry, several of the convention speakers pointed out. It was stated that thousands of women had lost their jobs through the elimination of buttons, hooks, and snaps from women's dresses, while the demand for handmade ties for men is making havoc in the machine-made necktie industry. Another

speaker reported that manufacturers of such ties are abandoning their businesses by the dozen as a result of the movement to popularize handmade ties, which are made by women working in their homes for very little compensation, while the average earnings of girl workers in the New York necktie manufacturing establishments have decreased approximately 35 per cent in the past four years.

In the opinion of the director of discussion, Miss Herstein, "the time has come for women to ask whether these frequent and radical changes in styles are in the interest of æsthetic value in clothing or are merely vagaries with no sound basis. A few years ago we thought shoes were the one thing which did not change in style. Now we think last year's brown oxfords are impossible because everybody is wearing pink ones."

After several delegates had voiced antagonism to the presence of married women in industry as inimical to wage standards and the employment of single women, Miss Mary Anderson, of the United States Women's Bureau declared that surveys of that bureau show that "in the majority of cases the married woman is in industry because her laboring husband makes too low wages to support the family in decency, and that she is as much in need of work as her unmarried sister. Don't talk," she said, "about the competition of the married women group in industry. Talk more about the competition of workers under 15 years of age, of girls working overtime for low wages, of workers who labor under undesirable working conditions, and thereby bring down the entire standards of labor."

In analyzing Wednesday's discussion, Dr. Lewis L. Lorwin, of the Brookings Institution, emphasized that there was an upper limit beyond which wages could not be pushed and likewise a lower limit, and that it was the province of trade-unions to try to work within this range of indeterminateness, and to protect the workers' wages from being depressed, and to help them get as much increase as is possible within these bounds.

The twenty-fifth birthday dinner of the league on the evening of May 8 was followed by tableaux showing the changing conditions surrounding women in industry.

### Recommendations and Resolutions

AMONG the recommendations approved and the resolutions adopted by the delegates were the following:

For the removal of the league headquarters from Chicago to Washington, D. C., in view of the organization's new work in the South and the desirability of being in closer touch with the national headquarters of the national labor movement.

For the support of a national policy for "the elimination from industry of children up to 16 years of age," of the move for the shorter workday and the 5-day week, and indorsing the theory of high wages, with consequent increased consuming power, as a preventive of unemployment.

Indorsing any step or half step toward the establishment of a national economics planning commission which would be able to put into effect on a national scale in the interest of producers and consumers the policies of "simplification, stabilization, and standardization."

Indorsing the Wheeler resolution for an investigation of the Tennessee textile industry by the United States Senate.

For the working out by the league's education committee of a series of lessons on subjects which "the committee feels would meet the demand of trade-union auxiliaries, local leagues, and other affiliated organizations, the subjects to include economics and trade-union history."

For cooperation with other organizations engaged in workers' education.

For the holding of week-end education conferences along the lines of those carried on under the auspices of the Wyoming Valley auxiliaries and the Philadelphia Women's Trade-Union League.

Urging increased demand of the union label on shoes in order to encourage the manufacture of American-made shoes.

Pledging league members and urging sympathizers and friends of the movement to ask for articles bearing the union label, "so that the combined purchasing power will create greater economic strength, through which more wages and better conditions can be obtained."

### Election of Officers

Miss Rose Schneiderman, of New York, was reelected president, and Miss Elisabeth Christman, of Chicago, secretary-treasurer. Miss Matilda Lindsay is the new vice president. Miss Agnes Nestor, former vice president, was not a candidate for reelection. The other incumbent officers were reelected. Mrs. Raymond Robins was unanimously named honorary president.

## Conference Between Organized Employers and Trades-Union Congress (England)

ON APRIL 23 a conference took place between the two national organizations of English employers and the general council of the Trades-Union Congress, which came as the result of a long series of negotiations. Early in 1928 a continuing body for conference and discussion had been formed consisting of a group of employers and of representatives of the general council of the Trades-Union Congress. In July this body published an interim report, containing a number of important recommendations, and invited the two organizations of employers to join with them in working out the plans therein outlined. (See Labor Review, September, 1928, p. 53.) The employers' organization took the matter under advisement, but made no reply until February, 1929, when they regretted their inability to cooperate with the general council in the way outlined. However, in their turn, they invited the general council to meet with them in order to hear an explanation of the difficulties in the way of their accepting the council's plan and to discuss the possibility of finding some way in which the three bodies might usefully consult together on matters of common concern "within the limits of their respective representative capacities and powers." (See Labor Review, April, 1929, p. 78.) This invitation the council accepted, and the meeting took place, as mentioned above, on April 23, 1929.

Both sides presented their views of the possibilities of the situation, and the conference ended in the adoption of a resolution to appoint a committee to examine the best methods for consultation and cooperation between the three organizations. This was a more definite result than had been expected and it is looked upon as a distinct gain for the policy of peace in industry.

"First of all," says the London Times of April 24th, "it may be noted that the ends in view are consultation and cooperation. The addition of the word 'cooperation' supplies what had been pointed out as an omission in the phraseology of the letter of invitation which the employers' organizations sent to the general council. It does not, in fact, add anything to the intentions of the employers, but puts those intentions beyond question. The national organizations of the employers and the trade-unions are now definitely embarked upon a policy of joint consultation and cooperation. The resolution recognizes the principle, leaving only the methods to be worked out."

The Economist (London) admits that in view of the approaching election, political considerations may have had some weight in bringing about the unexpectedly promising conclusion of the meeting, but feels that this was probably slight, and that in any case it is unimportant. Whatever the underlying motives and mental reservations of extremists on both sides, the important thing is that the national organizations of capital and labor "have now avowedly embarked upon a policy of joint effort, retreat from which will be rendered more difficult by every step which is taken in common deliberation and cooperative study of the problems with which British industry as a whole is faced." The use of the term "cooperation," it points out, means that capital recognizes labor's claim to fill an actively constructive part in the organization of industry, and that labor gives up its belief in the "class war," a modification of views on both sides which augurs well for the future.

It is a step which means that on the one side reactionary and obsolete notions of industrial autocracy have been abandoned—we hope, irrevocably—and that on the other side there is a growing recognition of the fundamental falseness of the Marxist conceptions which a few years ago seemed to be imperiling the sanity of organized British labor. The accumulating evidence that the leaders of the trade-unions are ready to indorse, and by these negotiations have indorsed, the principle that capital, management, and labor are indissolubly bound by common interests, should encourage employers to take new heart in determining to face and overcome, in a spirit of real partnership with the workers whom they at one and the same time control and serve, the problems of the future.

# INDUSTRIAL DISPUTES

## Strikes and Lockouts in the United States in April, 1929

DATA regarding industrial disputes in the United States for April, 1929, with comparable data for preceding months are presented below. Disputes involving fewer than six workers and lasting less than one day have been omitted.

The bureau is dependent upon trade journals, newspapers, and labor periodicals for notices of strikes. These reports are followed up by correspondence and when necessary by personal visits of representatives of the Conciliation Service or of this bureau.

Table 1 is a summary table showing for each of the months—January, 1927, to April, 1929, inclusive—the number of disputes which began in those months, the number in effect at the end of each month, and the number of workers involved. It also shows in the last column, the economic loss (in man-days) involved. The number of workdays lost is computed by multiplying the number of workers affected in each dispute by the length of the dispute measured in working-days as normally worked by the industry or trade in question.

TABLE 1.—INDUSTRIAL DISPUTES BEGINNING IN AND IN EFFECT AT END OF EACH MONTH, JANUARY, 1927, TO APRIL, 1929

| Month and year | Number of disputes— | | Number of workers involved in disputes | | Number of man-days lost during month |
|---|---|---|---|---|---|
| | Beginning in month | In effect at end of month | Beginning in month | In effect at end of month | |
| **1927** | | | | | |
| January | 37 | 18 | 5,915 | 2,287 | 58,125 |
| February | 65 | 45 | 9,756 | 5,717 | 115,229 |
| March | 74 | 67 | 13,142 | 8,182 | 214,283 |
| April | 87 | 88 | 202,406 | 199,701 | 5,265,420 |
| May | 107 | 116 | 22,245 | 200,702 | 5,136,006 |
| June | 80 | 88 | 18,957 | 196,323 | 4,863,345 |
| July | 65 | 63 | 33,994 | 199,287 | 5,308,123 |
| August | 57 | 53 | 8,150 | 198,444 | 4,999,751 |
| September | 57 | 58 | 12,282 | 196,829 | 4,945,702 |
| October | 50 | 58 | 13,024 | 82,095 | 2,724,117 |
| November | 27 | 51 | 5,282 | 82,607 | 2,040,140 |
| December | 28 | 54 | 4,281 | 81,229 | 2,129,153 |
| **1928** | | | | | |
| January | 48 | 63 | 18,850 | 81,880 | 2,128,028 |
| February | 52 | 58 | 33,441 | 103,496 | 2,145,342 |
| March | 41 | 47 | 7,459 | 76,069 | 2,291,337 |
| April | 71 | 48 | 143,700 | 129,708 | 4,806,232 |
| May | 80 | 56 | 15,640 | 133,546 | 3,455,490 |
| June | 44 | 46 | 31,381 | 143,137 | 3,670,878 |
| July | 54 | 42 | 18,012 | 132,187 | 3,337,386 |
| August | 59 | 42 | 8,887 | 105,760 | 3,553,750 |
| September | 52 | 34 | 8,897 | 62,862 | 2,571,982 |
| October | 61 | 42 | 27,866 | 41,474 | 1,304,913 |
| November | 44 | 38 | 37,840 | 38,745 | 1,300,362 |
| December | 23 | 29 | 5,172 | 35,842 | 991,238 |
| **1929** | | | | | |
| January | 45 | 34 | 14,727 | 39,484 | 949,692 |
| February | 48 | 34 | 20,134 | 40,385 | 921,583 |
| March [1] | 79 | 40 | 14,186 | 40,415 | 1,078,485 |
| April [1] | 99 | 61 | 27,680 | 51,865 | 1,385,796 |

[1] Preliminary figures subject to revision.

## Occurrence of Industrial Disputes, by Industries

TABLE 2 gives by industry the number of strikes beginning in February, March, and April, 1929, and the number of workers directly involved:

TABLE 2.—INDUSTRIAL DISPUTES BEGINNING IN FEBRUARY, MARCH, AND APRIL, 1929

| Industry | Number of disputes beginning— | | | Number of workers involved in disputes beginning— | | |
|---|---|---|---|---|---|---|
| | February | March | April | February | March | April |
| Auto, carriage and wagon workers | | | 1 | | | 127 |
| Bakery workers | 1 | | | 9 | | |
| Barbers | | | 1 | | | 14 |
| Brick and tile workers | | 3 | | | 131 | |
| Building trades | 13 | 10 | 25 | 1,599 | 1,125 | 4,187 |
| Chauffeurs and teamsters | | 5 | 4 | | 217 | 656 |
| Clerks and salesmen | | | 2 | | | 1,300 |
| Clothing workers | 10 | 28 | 14 | 6,230 | 3,923 | 2,863 |
| Farm labor | | | 1 | | | 100 |
| Furniture workers | 1 | 4 | 3 | 19 | 68 | 610 |
| Glass workers | | 1 | | | 32 | |
| Hotel and restaurant employees | | 1 | 1 | | 70 | 1,500 |
| Iron and steel workers | | | 1 | | | 150 |
| Laundry workers | 1 | | | 20 | | |
| Leather workers | 1 | | | 25 | | |
| Metal trades | 4 | 2 | 4 | 457 | 71 | 970 |
| Miners | 8 | 3 | 3 | 9,923 | 1,478 | 3,800 |
| Motion picture operators, actors, and theatrical workers | 2 | 1 | | 25 | 94 | |
| Oil and chemical workers | | 1 | | | 69 | |
| Paper and paper goods | | | 2 | | | 90 |
| Printing and publishing | | | 2 | | | 250 |
| Rubber workers | | 2 | | | 240 | |
| Shipbuilding | | 1 | | | 15 | |
| Slaughtering and meat packing | 1 | | 2 | 550 | | 71 |
| Stone workers | | | 1 | | | 100 |
| Telegraph and telephone employees | | 1 | | | 50 | |
| Textile workers | 5 | 12 | 29 | 1,107 | 6,516 | 9,038 |
| Tobacco workers | | 1 | | | 16 | |
| Miscellaneous | 1 | 3 | 3 | 170 | 71 | 1,854 |
| Total | 48 | 79 | 99 | 20,134 | 14,186 | 27,680 |

## Size and Duration of Industrial Disputes, by Industries

TABLE 3 gives the number of industrial disputes beginning in April, 1929, classified by number of workers and by industries:

TABLE 3.—NUMBER OF INDUSTRIAL DISPUTES BEGINNING IN APRIL, 1929, CLASSIFIED BY NUMBER OF WORKERS AND BY INDUSTRIES

| Industry | Number of disputes beginning in April, 1929, involving— | | | | |
|---|---|---|---|---|---|
| | 6 and under 20 workers | 20 and under 100 workers | 100 and under 500 workers | 500 and under 1,000 workers | 1,000 and under 5,000 workers |
| Auto, carriage, and wagon workers | | | 1 | | |
| Barbers | 1 | | | | |
| Building trades | 1 | 8 | 14 | 2 | |
| Chauffeurs and teamsters | | | 4 | | |
| Clerks and salesmen | | | 1 | 1 | |
| Clothing workers | 3 | 7 | 2 | 1 | 1 |
| Farm labor | | | 1 | | |
| Furniture workers | | 1 | 2 | | |
| Hotel and restaurant employees | | | | | 1 |
| Iron and steel workers | | | 1 | | |
| Metal trades | | 1 | 3 | | |
| Miners | | | 1 | | 2 |
| Paper and paper goods | 1 | 1 | | | |
| Printing and publishing | | 1 | 1 | | |
| Slaughtering and meat packing | | 2 | | | |
| Stone workers | | | 1 | | |
| Textile workers | 1 | 15 | 6 | 4 | 3 |
| Miscellaneous | 1 | 1 | | | 1 |
| Total | 8 | 37 | 38 | 8 | 8 |

In Table 4 are shown the number of industrial disputes ending in April, 1929, by industries and classified duration:

TABLE 4.—NUMBER OF INDUSTRIAL DISPUTES ENDING IN APRIL, 1929, BY INDUSTRIES AND BY CLASSIFIED DURATION

| Industry | Classified duration of strikes ending in April, 1929 | | | | |
|---|---|---|---|---|---|
| | One-half month or less | Over one-half and less than 1 month | 1 month and less than 2 months | 2 months and less than 3 months | 6 months and less than 7 months |
| Auto, carriage, and wagon workers | 1 | | | | |
| Barbers | 1 | | | | |
| Building trades | 12 | 3 | 3 | | 3 |
| Chauffeurs and teamsters | 3 | 2 | | | |
| Clerks and salesmen | 1 | | | | |
| Clothing workers | 10 | 2 | | 1 | 1 |
| Farm labor | 1 | | | | |
| Furniture workers | 2 | 1 | | | |
| Metal trades | | 1 | | | |
| Miners | 3 | | 1 | | |
| Paper and paper goods | 2 | | | | |
| Printing and publishing | | 1 | | | |
| Slaughtering and meat packing | 1 | | | | |
| Stone workers | 1 | | | | |
| Textile workers | 14 | 3 | 1 | 1 | |
| Miscellaneous | 2 | | | | |
| Total | 54 | 13 | 5 | 2 | 4 |

## Principal Strikes and Lockouts Beginning in April, 1929

*Retail clerks, New York.*—The Retail Grocery, Fruit, and Dairy Clerks' Union in New York City called a strike which began April 8, involving 900 workers and 370 establishments. Their demands in-

volved a renewal of contract, carrying a weekly wage increase of $5 above the former $40 scale. This strike, it is understood, ended successfully by April 22.

*Textile (rayon) workers, Tennessee.*—The American Glanzstoff Corp. was again affected by a strike of employees in its plant at Elizabethton beginning on or about April 15 because of alleged discrimination of the company against members of the newly formed textile union. The strike, it is said, also involved the near-by plant of the American Bemberg Corp., which is under the same management. These plants, according to press reports, normally give employment to 5,000 to 6,000 workers.

On April 16 it was reported that the plants would remain closed indefinitely. Some of the employees have become affiliated with the United Textile Workers, which is an American Federation of Labor organization. Others have joined a rival organization called the Loyal Bemberg and Glanzstoff Workers.

Partial operation of the plants was resumed on May 6, with soldiers on duty to preserve order.

Hearings were held on May 8 and 9 and again on May 20 by the Senate Committee on Manufactures on a resolution introduced by Senator Wheeler calling for an investigation by that committee of the textile mills of the Carolinas and Tennessee with special reference to wages and the tariff.

Operation of the mechanical and chemical departments of the plants were resumed on May 6; and on May 21, it was said, the full production of the plants had almost reached normal.

*House wreckers, New York City.*—According to press reports approximately 1,800 house wreckers, members of Local 95, struck on April 1. The strike it is said, affects 74 employers in the House Wreckers Association (Inc.). The demands included a wage increase of 10 cents an hour from $1.25 an hour for skilled wreckers and $1.15 an hour for helpers.

According to press announcements this strike was settled on the afternoon of May 6. Under the agreement barmen who have been getting $1.25 an hour will receive $1.30 immediately and until March 31, 1930, when they are to receive $1.35, the schedule to be effective until April 1, 1931. Helpers are to receive immediately $1.20 an hour instead of $1.15 as formerly, and they are to receive a further increase of 5 cents an hour on April 1, 1930, continuing until April 1, 1931.

*Restaurant and cafeteria workers, New York City.*—A strike of workers in the restaurants and cafeterias in the district bounded by Sixth and Ninth Avenues and Twenty-fifth and Thirty-ninth Streets was begun on April 4 for a general betterment of conditions and an increase in the wage scale from $12 a week minimum and $30 maximum to $22 minimum and $50 maximum per week, also an 8-hour day instead of 12 hours, and a 6-day week instead of six and a half and seven days, etc. The strike was called by the Hotel, Restaurant, and Cafeteria Workers' Branch of the Amalgamated Food Workers, and by April 7 it was reported in the press that according to strike leaders nearly 1,500 persons, about one-half the total number employed in the district, where there are 125 restaurants, were on strike.

No report of the ending of this strike has been received.

*Shoe workers, Massachusetts.*—According to press reports a strike of several hundred shoe lasters began in Boston on April 8 for reduced hours, better working conditions, and increases in piecework prices. This strike was called by the Boston Independent Lasters' Union No. 450, and the purpose of the strike, it was stated, was to get wages and working conditions for the Boston workers equal to those at Lynn. Spreading to other groups of shoe workers in Boston the number of workers on strike by the second week had greatly increased. Great discrepancy in reports is noted as to the actual number of strikers, the estimates ranging from 1,500 to 10,000.

The strike spread to Chelsea on April 15, where the number of workers that are out is variously reported at from 800 to 1,500.

*Anthracite coal miners, Pennsylvania.*—Three collieries of the Kingston Coal Co., Edwardsville, were affected, it is said, by a strike of 1,700 miners from April 4 to April 14, in protest against unequal distribution of working time. Differences were settled in conference and the workers returned.

The Glen Alden Coal Co., Nanticoke, also was affected by a strike which, it is understood, lasted only one day, April 19. This strike, it appears, was caused by a "bratticeman" being moved to another section of the mine, and it was agreed to reinstate him in his original position. About 2,000 miners were directly involved.

*Textile workers, North Carolina.*—A number of strikes in the cotton-textile mills of North Carolina occurred during April. Most of them involved only a small number of workers. A description of the more important of these strikes follows, by location.

Gastonia: The employees of the Loray Cotton Mill, of the Manville Jenckes Co., struck on April 2, according to press reports, demanding a standard wage scale, minimum weekly wage of $20, 40-hour 5-day week, abolition of speeding system, equal pay for equal work for women and youth, sanitary housing and working conditions, reduction by 50 per cent of rent and light charges, and recognition of union. This strike has been conducted by the National Textile Workers' Union and involved approximately 1,100 persons. It was reported in the press that 1,000 workers had returned by April 12 and that by April 18 the plant was operating at capacity.

Forest City: Here, according to press reports, a strike began in the Florence Mill on April 8 for the abolition of the efficiency system and a wage increase of 20 per cent. The employees, numbering 500, returned, it is understood, on April 11, having secured the abolition of the efficiency system but not the wage increase.

*Textile workers, South Carolina.*—In addition to the strikes occurring in South Carolina in March and referred to in the preceding issue of the Review, several strikes took place in April. The more important of these strikes are described below, according to location.

Union: Claiming they were overworked the employees of the Monarch Mills began a strike on April 3 against the efficiency system. About 800 workers were involved either directly or indirectly.

Employees, numbering 639, of the Union-Buffalo Mills Co. struck on April 1 against the "stretch-over system." The weavers objected to additional looms. Most of the workers, it is understood, returned by April 15, under an agreement or understanding that each weaver is to operate 84 looms.

A strike of approximately 300 employees of the Ottaray Mills is also reported to have begun on April 3 against the "stretch-out" system, claiming to be overworked. The strikes at the Monarch and Ottaray mills were settled satisfactorily on May 14, the employees resuming work on May 16. The settlement is understood to be a compromise, under which the weavers will operate 72 looms at a $21-a-week scale when operated to full production, and battery fillers were given an increase in pay of one-fourth of 1 cent per battery not to exceed 72 looms. Formerly regular battery fillers were paid 4 cents and the spare hands 3½ cents. These rates were raised to 4¼ and 3¾ cents, respectively. These mills are under the same management.

Anderson: Protesting against the stretch-out system approximately 300 weavers and loom fixers, comprising the day and night shifts of the Anderson Cotton Mills, quit work on April 4, according to press reports. The closing down of the plant threw other employees out of work, so that the total number of employees idle because of the strike is approximately 1,000.

### Principal Strikes and Lockouts Continuing into April, 1929

*Textile workers, South Carolina.*—The strike at the Brandon Mills, Greenville (including, it is understood, the duck mill), which began March 27, was settled with the return of the workers on May 20, following the acceptance by them of the terms offered by the mill management, which were in the nature of a compromise. Virtually the same terms, it is said, were accepted by the employees of the Poinsett Mills, operations to be resumed May 23. The strike at the Woodruff Cotton Mills has also been settled, on the terms allowed the employees of the Brandon and Poinsett mills, operations to be resumed May 27.

## Conciliation Work of the Department of Labor in April, 1929

By Hugh L. Kerwin, Director of Conciliation

THE Secretary of Labor, through the Conciliation Service, exercised his good offices in connection with 97 labor disputes during April, 1929. These disputes affected a known total of 77,696 employees. The table following shows the name and location of the establishment or industry in which the dispute occurred, the nature of the dispute (whether strike or lockout or controversy not having reached the strike or lockout stage), the craft or trade concerned, the cause of the dispute, its present status, the terms of settlement, the date of beginning and ending, and the number of workers directly and indirectly involved.

On May 1, 1929, there were 75 strikes before the department for settlement and in addition 30 controversies which had not reached the strike stage. The total number of cases pending was 105.

## LABOR DISPUTES HANDLED BY THE UNITED STATES DEPARTMENT OF LABOR THROUGH ITS CONCILIATION SERVICE, APRIL, 1929

| Company or industry and location | Nature of controversy | Craftsmen concerned | Cause of dispute | Present status and terms of settlement | Duration | | Workers involved | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Beginning | Ending | Directly | Indirectly |
| | | | | | 1929 | 1929 | | |
| Photo-engravers, New York City | Strike | Photo-engravers | Wages, conditions, union recognition. | Pending | Mar. 4 | | 70 | 30 |
| Plumbers and steamfitters, Shamokin, Pa. | do | Building | Asked 5-day week and 10 per cent increase. | Adjusted. Agreement of 1928 continued till May 1, 1929; 40-hour week. | Apr. 1 | Apr. 8 | 61 | |
| Electricians, Cedar Rapids, Iowa | Threatened strike. | do | Asked $1 per day increase—$10 per day. | Adjusted; 2-year agreement; $9.40 per day. | do | May 1 | 35 | 1,200 |
| United States Shoe Co., Louisville, Ky. | Strike | Shoe workers | Alleged discrimination for union affiliation. | Pending | Mar. 26 | | 69 | |
| L. Pavia, Reed & Harness Co., Allentown, Pa. | do | Makers of loom fixtures. | Wages cut 10 per cent | Unclassified. Strikers replaced before arrival of commissioner. | Mar. 28 | Apr. 3 | 14 | |
| Packing-house employees, Scranton, Pa. | do | Employees of packers. | Asked 10 per cent wage increase. | Pending | Apr. 2 | | 50 | 10 |
| Mitchell & Welch, West Lynn, Mass. | do | Shoe workers | Asked union recognition | Adjusted. Allowed recognition | Feb. 28 | Apr. 2 | 150 | |
| House wreckers, New York City | do | House wreckers | Asked 10 cents per hour increase. | Adjusted. Allowed 5 cents per hour increase and 5½-day week. | Mar. 15 | May 3 | 1,800 | |
| Poinsett Mill, Greenville, S. C. | do | Weavers, carders, spinners, and loom fixers. | Wages and protest increased number of looms to the operator. | Pending | Apr. 1 | | 325 | 2,275 |
| Davis Cab Co., Cincinnati, Ohio | do | Drivers | Cut from $25 to $15 per week (plus commissions); discharges. | Adjusted. Satisfactory wage agreement concluded; discharged men not reinstated. | Mar. 28 | Apr. 10 | 255 | 20 |
| Bates-Lang Overall Factory, Minneapolis, Minn. | Lockout | Garment makers | Proposed wage cut | Unable to adjust. Plant closed | Apr. 1 | Apr. 15 | 30 | |
| Kingston Coal Co., Edwardsville, Pa. | Strike | Miners | Equalization of work | Adjusted. Miners returned without change in conditions. | Apr. 4 | Apr. 14 | 1,700 | 100 |
| Glaziers, Youngstown, Pa | do | Glaziers | Wage increase | Adjusted. Allowed 50 cents per day increase. | Apr. 1 | Apr. 5 | 21 | |
| Marian Davies Theater, San Francisco, Calif. | Threatened strike. | Musicians | Employment of union orchestra. | Pending | do | | 12 | 25 |
| Danville Stove Works, Danville, Pa. | Lockout | Molders | Men refused to accept wage cut. | Adjusted. Accept 10⅝ cents per hour cut; 80 cents. | Mar. 25 | Apr. 15 | 27 | |
| Bank building and school building, East Chicago, Ill. | Controversy | Lathers and carpenters. | Jurisdiction of placing steel corner guards. | Adjusted. Carpenters withdrew claims on this particular job. | Apr. 8 | Apr. 29 | 40 | 100 |
| Lasters, Boston, Mass | Strike | Lasters | Asked wage increase and recognition. | Pending | do | | 600 | |
| S. & M. Silk Co., Allentown, Pa | do | Silk weavers | Wages cut ¾ cent per yard | do | Apr. 6 | | 108 | |
| Monarch Mill, Union, S. C | do | Cotton weavers | Refusal to accept new efficiency system increasing number of looms, etc. | do | Apr. 3 | | 800 | |
| Buffalo Mill, Union, S. C | do | do | do | Adjusted. Returned; no increase in number of looms. | Apr. 1 | Apr. 16 | 625 | |
| Ottaray Mill, Union, S. C | do | do | do | Pending | Apr. 3 | | 300 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Broad silk workers, Stroudsburg, Pa. | ....do.... | Silk weavers, etc. | Readjustment of wage scale. | Adjusted. Settled in conference between parties at interest. | Apr. 2 | Apr. 11 | 90 | ..... |
| Narrow Fabrics Co., Warren, R. I. | ....do.... | Textile workers | Asked wage increase from 5 to 6 cents per hour; night shift from 5½ to 6½ cents. | Unable to adjust | Mar. 28 | Apr. 10 | 70 | 65 |
| Wennonah Mills, Lexington, N. C. | ....do.... | Cotton-textile workers. | Asked readjustment of wage rates. | Pending | Apr. 8 | ..... | 75 | 175 |
| Central Trust Bank Building, Chicago, Ill. | Threatened strike. | Carpenters, laborers, cement finishers. | Nonunion craftsmen employed. | ....do.... | Apr. 12 | ..... | 100 | 50 |
| Lake Washington Shipyard, Houghton, Wash. | Strike..... | Boiler makers..... | Asked 10 cents per hour increase—92 cents per hour. | ....do.... | Apr. 11 | ..... | 55 | 135 |
| Cafeteria workers, New York City. | ....do.... | Cafeteria workers... | Wages, hours, and recognition. | ....do.... | Apr. 3 | ..... | 1,500 | ..... |
| Dairy, grocery, and fruit clerks, New York City. | ....do.... | Clerks..... | Asked $41 per week and 6-day week. | ....do.... | Apr. 9 | ..... | 400 | ..... |
| Painters and decorators, Rock Island and Moline, Ill., and Davenport, Iowa. | ....do.... | Painters and decorators. | Asked $1 per day increase and 5-day week. | Adjusted. Allowed $1.12½ per hour and 5½-day week till Apr. 30, 1930. | Apr. 7 | May 3 | 250 | 1,600 |
| Superior Dress Co., Philadelphia, Pa. | ....do.... | Garment workers... | Asked recognition of Needles Trades Workers International Union. | Unclassified. Agreement granting recognition signed before commissioners' arrival. | Mar. 30 | Apr. 10 | 40 | ..... |
| Carpenters, plumbers, steamfitters, electricians, and painters, Geneva, N. Y. | ....do.... | Building..... | Asked 5-day week and $1 per day increase. | Unclassified. No increase; allowed 5-day week. | Apr. 1 | Apr. 8 | 200 | 250 |
| Anderson Manufacturing Co., Louisville, Ky. | ....do.... | Painters..... | Refusal of company to sign agreement relative to spraying machines. | Pending | Apr. 15 | ..... | 28 | 250 |
| Monroe Shop & Construction Works, Pittsburgh, Pa. | Threatened strike. | Boiler makers..... | Wage dispute | ....do.... | Apr. 17 | ..... | 17 | ..... |
| Barracks Building, Fort Harrison, Ind. | Controversy | Cement and terrazzo workers. | Jurisdiction of cement finishing. | Adjusted. Work awarded to cement workers. | Apr. 10 | Apr. 22 | 6 | 100 |
| Building, Indianapolis, Ind | ....do.... | Building..... | Asked 5-day week | Pending | Apr. 13 | ..... | 5,000 | 500 |
| Electricians, La Fayette, Ind | Strike..... | Electricians..... | Asked $1.10 per hour | Adjusted. Allowed $1.05 per hour | Apr. 1 | Apr. 18 | 20 | 550 |
| Hess-Goldsmith Co., Wilkes-Barre and Plymouth, Pa. | ....do.... | Silk textile workers. | Wages and 8-hour day | Pending | Apr. 10 | ..... | 400 | 10 |
| Painters and paper hangers, Toledo, Ohio. | ....do.... | Building..... | Asked $1.25 per hour and 5-day week. | Unable to adjust | Apr. 1 | Apr. 19 | 100 | ..... |
| Painters and decorators, Milford, Mass. | ....do.... | ....do..... | Wage increase and 5-day week. | Adjusted. Returned; allowed 95 cents per hour and 44-hour week. | ....do.... | Apr. 15 | 24 | ..... |
| Shoe factories, Chelsea, Mass | ....do.... | Shoe workers..... | Asked increase and union recognition. | Pending | Apr. 15 | ..... | 1,500 | ..... |
| Shoe workers, Boston, Mass | ....do.... | ....do..... | ....do..... | ....do..... | Apr. 10 | ..... | 10,000 | ..... |
| Upland Citrus Association, Upland, Calif. | ....do.... | Fruit packers..... | Wages for packing | Unclassified | Apr. 11 | Apr. 12 | 100 | 200 |
| Electric inside wiremen, Seattle, Wash. | Controversy | Electricians..... | Asked wage increase | Pending | Apr. 1 | ..... | 400 | 6,000 |
| Electricians, painters, and carpenters, Kingston, N. Y. | Strike..... | Building..... | Asked 5-day week and wage increase. | ....do.... | ....do.... | ..... | 425 | 175 |
| Robinson Hosiery Co., Philadelphia, Pa. | Lockout.... | Hosiery knitters.... | Increased hours from 48 to 54 per week. | ....do.... | Apr. 15 | ..... | 100 | ..... |
| Plumbers, Oskaloosa, Iowa | Strike..... | Building..... | Asked 10 cents per hour increase—90 cents. | Unclassified. Strike called off | Apr. 1 | Apr. 14 | 14 | ..... |

LABOR DISPUTES HANDLED BY THE UNITED STATES DEPARTMENT OF LABOR THROUGH ITS CONCILIATION SERVICE, APRIL, 1929—Continued

| Company or industry and location | Nature of controversy | Craftsmen concerned | Cause of dispute | Present status and terms of settlement | Duration | | Workers involved | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Beginning | Ending | Directly | Indirectly |
| | | | | | 1929 | 1929 | | |
| Decotah Mill Lexington, N. C | Strike | Cotton-textile workers. | Wage cuts | Pending | Apr. 8 | | (1) | |
| Duck Mill, Greenville, S. C | do | do | Protest increased number of looms. | do | Apr. 1 | | (1) | |
| Loray Mill, Gastonia, N. C | do | do | Wages and working conditions. | do | do | | (1) | |
| Chadwick-Hoskins Mill, Pineville, N. C. | do | Textile workers | Working conditions | do | (1) | | (1) | |
| Florence Mill, Forest City, N. C | do | do | do | Adjusted. Returned without change | (1) | | 750 | |
| Woodruff Mill, Woodruff, S. C | do | do | do | do | (1) | | 600 | |
| Anderson Mill, Anderson, S. C | do | do | Increased number of looms | Pending | (1) | | 1,250 | |
| Painters, Haverhill, Mass | do | do | Wages and conditions | Unclassified. Settled before commissioner's arrival. | Apr. 1 | Apr. 8 | 105 | |
| Pipe coverers, Rochester, N. Y | do | Pipe coverers | Asked wage increase from $1.15 to $1.37½ per hour. | Pending | do | | 30 | 20 |
| Glen Alden Coal Co., Nanticoke, Pa. | do | Miners | Man discharged | Adjusted. Returned district officials to fix terms. | Apr. 19 | Apr. 19 | 2,000 | 30 |
| Milk-wagon drivers, Seattle, Wash | Controversy | Drivers | Asked increase of 75 cents per day and 2 weeks' vacation with pay. | Pending | Mar. 25 | | 500 | |
| Bemberg-Glanzstoff Corporation, Elizabethton, Tenn. | Strike | do | Violation of recent understanding. | do | Apr. 15 | | 4,500 | 3,500 |
| Reick-McJunkin Co., Pittsburgh, Pa. | do | Milk-wagon drivers | Working conditions | Adjusted. Men reinstated without discrimination. | Apr. 22 | Apr. 30 | 120 | |
| Building trades, Buffalo, N. Y | Controversy | Building | Wage increase and 5-day week. | Pending | Apr. 15 | | 8,000 | 5,000 |
| Allis Chalmers Manufacturing Co., Pittsburgh, Pa. | Strike | Machinists | Working conditions; recognition. | do | Apr. 22 | | 300 | |
| Warner Co., Philadelphia, Pa | do | Truck drivers | Wages cut from 66 to 60 cents per hour and from 58 to 55 cents. | Adjusted. Compromised on 63 cents per hour new men to receive 60 cents first 3 months. | do | Apr. 24 | 150 | |
| Building, Baltimore, Md | do | Building crafts | Wages for municipal work | Adjusted. Committee to establish wage rate on municipal work. | do | do | 200 | 100 |
| Plumbers and steam fitters, Plainfield, N. J. | do | do | Working conditions and 5-day week. | Adjusted. Allowed $12 for 8 hours; plumbers to do work 450 feet high. | Apr. 1 | May 4 | 125 | 20 |
| Building laborers, Waterloo, Iowa | do | Building laborers | Asked increase of 12½ cents per hour. | Unclassified. Agreed on 50 cents per hour before commissioner's arrival. | do | Apr. 9 | 150 | |
| Carpenters, Monmouth, N. J | do | Carpenters | Asked $12 per day and 5-day week. | Adjusted. Allowed $11 per day and 5-day week. | Apr. 12 | Apr. 20 | 493 | |
| Do | do | do | do | do | do | do | 522 | |
| Do | do | do | do | do | do | do | 327 | |
| Do | do | do | do | do | do | do | 398 | |
| Wyoming Shovel Works, Wyoming, Pa. | do | Shovel workers | Wage dispute failure to abide by understanding. | Pending | Apr. 25 | | 300 | |
| | | Furniture workers | Working conditions dis- | Adjusted. Satisfactory agreement | Apr. 22 | Apr. 29 | 385 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| J. L. Witz Furniture Co., Staunton, Va. | ---do--- | Furniture workers | Working conditions dismissals. | Adjusted. Satisfactory agreement concluded. | Apr. 22 | Apr. 29 | 385 | ------- |
| Basic Furniture Co., Waynesboro, Va. | ---do--- | ---do--- | Working conditions | ---do--- | ---do--- | ---do--- | 165 | ------- |
| Dill Collins Manufacturing Co., Philadelphia, Pa. | ---do--- | Paper workers | Protest against "speed-up" system. | Adjusted. Returned without change | Apr. 4 | Apr. 10 | 12 | 18 |
| All building crafts, La Fayette, Ind. | Theatened lockout. | Building | Wages of electricians | Adjusted. Averted when electricians compromised on $1.05 per hour. | Apr. 1 | Apr. 18 | 550 | ------- |
| Hollywood Theater, Pottsville, Pa. | Strike | Film-machine operators. | Discharge of 2 operators and organist. | Pending | ---do--- | | 3 | ------- |
| Lyric Theater, Minersville, Pa. | ---do--- | ---do--- | Asked reinstatement of operator. | ---do--- | Apr. 17 | | 3 | 13 |
| A. & R. Silk Mill, Elmira, N. Y. | ---do--- | Weavers | Wage cut of ¼ cent per yard | ---do--- | Apr. 25 | | 11 | 20 |
| Cornet Silk Mill, Elmira, N. Y. | ---do--- | ---do--- | ---do--- | ---do--- | Apr. 24 | | 31 | 50 |
| Ayres Building, Indianapolis, Ind. | Controversy | Painters and bricklayers. | Pointing work around windows. | Adjusted. Bricklayers to do pointing work. | ---do--- | May 7 | 20 | 90 |
| First Baptist Church, Indiana Harbor, Ind. | Threatened strike. | Building crafts | Jurisdiction of "bull-dog" corner placing. | Pending | Apr. 20 | | 25 | 3 |
| Hilgsmeier Co., Indianapolis, Ind. | Strike | Laborers and hod carriers. | Jurisdiction of cork distribution. | Adjusted. Satisfactory division of cork work. | Apr. 24 | Apr. 25 | 7 | 20 |
| American Cigar Box Lumber Co., Johnson City, Tenn. | Controversy | Cigar-box makers | Alleged discharges for union affiliation. | Pending | ---do--- | | 40 | 235 |
| Engravers, San Francisco, Calif. | Strike | Engravers | Asked 40-hour week | ---do--- | ---do--- | | 200 | 300 |
| Motion-picture theaters, Lebanon, Pa. | Threatened strike. | Projectionists | Sympathy with musicians | ---do--- | ---do--- | | 12 | ------- |
| Do | Strike | Musicians | Alleged violation of contract | ---do--- | ---do--- | | 5 | ------- |
| State Theater, Harrisburg, Pa. | ---do--- | Motion-picture operators. | (1) | ---do--- | Apr. 29 | | (1) | ------- |
| Berman Silk Co., Paterson, N. J. | ---do--- | Weavers | Alleged inequalities in pay | ---do--- | Apr. 25 | | 20 | 10 |
| Marillyn Silk Co., Phillipsburg, N. J. | ---do--- | ---do--- | Proposed ½ cent cut per yard for weaving. | Adjusted. Proposal withdrawn | Apr. 19 | Apr. 26 | 48 | 52 |
| Pettibone Colliery, Kingston, Pa. | ---do--- | Miners | Dispute relative to union fines. | Adjusted. Returned; general committee to fix terms. | Apr. 27 | Apr. 29 | 375 | 5 |
| Painters, Lynn, Mass. | Controversy | Painters | Alleged violation of agreement. | Pending | Apr. 28 | | (1) | ------- |
| Standard Silk Co., Phillipsburg, Pa. | Strike | Silk weavers | Wage cut | ---do--- | Apr. 26 | | 122 | ------- |
| Painters and decorators, Salem and vicinity, Mass. | ---do--- | Building | Asked $1.25 per hour | Adjusted. Allowed $1.25 per hour; 40-hour week. | Apr. 1 | Apr. 29 | 400 | ------- |
| Saltex Mills, Bridgeport, Conn. | ---do--- | Textile workers | Asked wage increase | Adjusted. Allowed increase from 64 to 73 cents per hour. | Apr. 23 | Apr. 26 | 400 | ------- |
| Shelton Looms, Shelton, Conn. | Threatened strike. | ---do--- | Sympathy with Saltex Mills workers. | Adjusted. Averted when Saltex Mills settled. | ---do--- | ---do--- | 2,200 | ------- |
| Sign painters, Detroit, Mich. | Strike | Painters | Asked $13.20 per day and 5-day week. | Pending | Apr. 1 | | 200 | ------- |
| | | | | | 1928 | | | |
| Plumbers and steamfitters, Milford, Mass. | ---do--- | Plumbers and steam fitters. | Asked $1.25 per hour and 5-day week. | Adjusted. Allowed $1.05 per hour and 5-day week. | Oct. 1 | Apr. 17 | ------- | ------- |
| American LaFrance & Foamite Corporation, Elmira, N. Y. | Controversy | Machinists | Asked fixed minimum wage | Adjusted. Allowed union shop and shop committee. | June 18 | Apr. 29 | 312 | ------- |
| Total | | | | | | | 54,390 | 23,306 |

[1] Not reported.

## Findings of Industrial Commission of Colorado in Centennial Mine Case

ON MAY 3, 1929, the Industrial Commission of Colorado rendered a decision in the case of the coal miners in the lignite fields of Boulder and Weld Counties of Colorado and the operators of the Centennial Mine. The decision of the commission granted the miners the right of collective bargaining, and the same scale of day wages and working conditions as those now in effect and being paid by the Rocky Mountain Fuel Co., and which are specified in the 2-year agreement between that company and the United Mine Workers of America. (Labor Review, October, 1928, pp. 196–202.)

The following petition signed by employees of the Centennial Mine was filed with the commission:

> We, the undersigned employees working in and about the lignite mines in Boulder and Weld Counties, in the State of Colorado, for the employing companies hereinafter designated opposite our respective names, hereby petition said designated companies and your commission for the same scale of day wages, tonnage, yardage, and dead-work scales and working conditions as are now in effect and being paid at the mines in the said field which are now operated by the Rocky Mountain Fuel Co. and which are specified in that certain agreement between the Rocky Mountain Fuel Co. and the United Mine Workers of America, District No. 15, dated August 16, 1928, now on file with and approved by your commission and hereto attached.
>
> We further petition that said wages, scales of compensation, and conditions of employment be applied and made effective within 30 days following the filing of this petition and notice with your commission and service thereof upon said designated employers.
>
> Further, your commission and said employers are notified that unless compliance is made with the foregoing petition and notice within the time fixed by the law after filing of the same and service thereof, petitioners will exercise their rights under the law following the expiration of said time.

A hearing was held on the above petition on April 22, 1929, at Denver, Colo., notices having been sent to the following parties: The Boulder Valley Coal Co., the Centennial Mine, the Colorado State Federation of Labor, and district No. 15, United Mine Workers of America.

At this time petitions were filed by some of the employees of the Wm. E. Russell Coal Co., the Shamrock Mine, the State Mine, and the Puritan Mine.

At the request of the commission, the president of the Rocky Mountain Fuel Co., the president of the Wm. E. Russell Coal Co., the general superintendent of the National Fuel Co., the sales manager of the Boulder Valley Coal Co., and the president of the Clayton Coal Co. testified at the hearing.

The petitioners contended that they were entitled to the same scale of wages, tonnage, yardage, and dead work, and the same working conditions as are now in force and effect in the mines of the Rocky Mountain Fuel Co., and to the same system of collective bargaining as that contained in the agreement made between that company and the United Mine Workers of America, and also contended that such an agreement would help to stabilize the coal industry.

Testimony was also introduced to show that slack or steam coal had been sold for as low as 10 cents per ton; and at the time of the hearing the Rocky Mountain Fuel Co. had a contract for 75 cents a

ton and the National Fuel Co. one for 86 cents a ton. As these prices are far below the cost of production, the price on the rest of the coal produced must be increased to meet the loss sustained on the slack and steam coal.

Merl D. Vincent, president of the Rocky Mountain Fuel Co., testified that the agreement between his company and the United Mine Workers of America was very satisfactory and read the following statement into the record:

There has been a marked change in the relations between the company and the men. A better understanding and a spirit of cooperation has developed. There is a noticeable increase in the efficiency of the men in the mines and our own organization. Grievances and complaints are quickly settled by the pit committees and the superintendents with apparent satisfaction and fairness. Appeals have been taken in two cases only in the more than seven months the contract has been in force. The pit committees in two of our mines report that no complaints have been made.

During the first quarter of this year there has been a noticeable increase in efficiency, reflected in part by an increase in tonnage production per man per day. There was also a decrease in cost per ton during the first quarter of this year. The average increase per man per day in all our mines in March this year as against March in 1928 was 2.7 tons. We find this increased efficiency and morale extending through the entire organization. While the men are paid for work at contract rates, which has increased their earnings, costs have not increased but show a decrease, due in part to more efficient work and better cooperation.

A stabilized cost is the first step toward a stabilized market. At present no two operators are on the same labor-cost basis. Some pay more or less than others for the same class of work. If all were put on the same basis, there would be greater incentive, and I am sure tendency, to regulate their production to market demands and maintain reasonable and uniform prices.

The coal industry in this field can be made to adequately compensate every one engaged in it and at the same time serve the public at reasonable prices.

The findings and award of the Industrial Commission of Colorado follow:

Labor is entitled to an adequate wage and the employer to a fair return on his investment. Labor and capital are necessary for the success of any kind of an industrial enterprise. One is as necessary as the other. They should work in harmony if labor is to receive an adequate wage and the employer is to receive a fair return on the investment. To secure these ends it would seem that a system of collective bargaining should be used. Experience has shown that it is not to the best interests of the employees to leave their welfare exclusively in the hands of the employer. While it is true that many of the employers protect the interests of their employees, there are others who do not. The only safe and sure protection for the employee consists of his ability to bargain collectively.

Labor organizations are as much the product of modern industrial life as the corporation. There was a time when the individual workman could bargain with his employer on something like equality. Industrial development has reached a point where it is impossible in many cases for the employee to deal as an individual with his employer. In some cases the employer is a corporation with large amounts of invested capital and thousands of employees. Under these conditions it is impossible for the individual workman to bargain on an equal basis. In such a case it is no bargain at all. The individual workman can accept the conditions named by the employer or look for other employment. Very little freedom of contract can exist between a man who has nothing but his labor to sell and the employer who can do without the labor of any particular individual. Freedom of contract under such conditions is little more than an idle dream because of the self-evident inequality.

The right of the miners to bargain collectively should not be denied or abridged by any employer. It is one of their rights and the one principle that will settle many industrial controversies. There should be no opposition on the part of the employers to this principle. It seems to us it is one of the very best and safest instruments for the attainment of industrial peace and justice.

Capital and labor must cooperate before they can really become efficient and effective. They should work together in a spirit of friendly cooperation. The

time has passed when any employer or owner of a mine can operate it as he pleases. Such a policy is opposed to the common good. The employee must have the right to share in determining what his working conditions shall be if he is to become satisfied and contented—a contented employee is an asset to any company.

From the evidence submitted by the president of the Rocky Mountain Fuel Co. it would seem that the agreement between said company and the United Mine Workers of America is working in a very efficient and effective manner, both as to the men and the company. This contract stabilizes the price of labor, because they have signed up, as we understand it, for a period of two years.

It is the decision of the commission that the application of the employees of the Centennial Mine of the Boulder Valley Coal Co. be granted, and that the company shall allow the right of collective bargaining, pay the same wage scale, and grant the working conditions now in force in the mines of the Rocky Mountain Fuel Co.

The commission would suggest that the mine operators in the northern Colorado coal fields should have some kind of an agreement not to sell slack or steam coal at less than the cost of production. This would be collective bargaining on the part of the employer, and if collective bargaining is right on the part of the employee it is also just on the part of the employer.

# WAGES AND HOURS OF LABOR

## Wages and Hours of Labor of Common Street Laborers, 1928

THE entrance wage rates and regular hours of labor of unskilled street laborers directly hired by more than 2,600 cities and towns in the United States have been compiled by the Bureau of Labor Statistics. The full compilation, giving details by individual communities, will appear in bulletin form. A brief summary of this report is given in this article.

The rates shown are those paid by the municipalities to common laborers when first engaged on the construction, repairing, or cleaning of streets. Higher rates may be paid for greater skill or after a period of service.

The questionnaires for this inquiry were sent out by the United States Bureau of Labor Statistics, under date of October 31, 1928, to all cities and towns having a population of 2,500 or over according to the 1920 census. About 93 per cent of these municipalities replied.

### Classified Hourly Wage Rates

IN TABLE 1 are given classified entrance wage rates for common street labor, the number of municipalities in each State paying each classified wage rate, as well as the percentage of all municipalities paying each classified wage rate being shown. Of the 2,626 municipalities reporting, 593, or 23 per cent, were paying 40 and under 45 cents per hour and 553, or 21 per cent, were paying 50 and under 55 cents per hour. While 896, or about 34 per cent, paid under 40 cents per hour, only about 15 per cent paid 55 cents or more.

TABLE 1.—CLASSIFIED HOURLY RATES OF WAGES OF UNSKILLED COMMON LABOR HIRED BY CITIES FOR WORK IN CONSTRUCTING, REPAIRING, OR CLEANING STREETS

| State | Number of cities reporting | Number of cities in which hourly wage rates of street laborers were— | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Under 15 cts. | 15 and under 20 cts. | 20 and under 25 cts. | 25 and under 30 cts. | 30 and under 35 cts. | 35 and under 40 cts. | 40 and under 45 cts. | 45 and under 50 cts. | 50 and under 55 cts. | 55 and under 60 cts. | 60 and under 65 cts. | 65 and under 70 cts. | 70 and under 75 cts. | 75 and under 80 cts | 80 and under 85 cts. |
| Alabama | 33 | ---- | 9 | 14 | 6 | 4 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Arizona | 15 | ---- | ---- | ---- | ---- | 3 | 4 | 4 | ---- | 2 | 2 | ---- | ---- | ---- | ---- | ---- |
| Arkansas | 38 | 1 | ---- | 10 | 20 | 4 | 2 | 1 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| California | 103 | ---- | ---- | ---- | ---- | ---- | 3 | 9 | 3 | 38 | 20 | 21 | 7 | 1 | ---- | 1 |
| Colorado | 26 | ---- | ---- | ---- | ---- | ---- | 7 | 11 | 2 | 4 | 1 | 1 | ---- | ---- | ---- | ---- |
| Connecticut | 30 | ---- | ---- | ---- | ---- | ---- | 2 | 3 | 6 | 12 | 4 | 1 | 1 | ---- | 1 | ---- |
| Delaware | 3 | ---- | ---- | ---- | ---- | 1 | 1 | 1 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| District of Columbia | 1 | ---- | ---- | ---- | ---- | ---- | ---- | 1 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Florida | 26 | ---- | 4 | 6 | 6 | 7 | 2 | 1 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Georgia | 54 | 2 | 23 | 19 | 6 | 2 | 2 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Idaho | 20 | ---- | ---- | ---- | ---- | ---- | 4 | 8 | 2 | 3 | 2 | 1 | ---- | ---- | ---- | ---- |

TABLE 1.—CLASSIFIED HOURLY RATES OF WAGES OF UNSKILLED COMMON LABOR HIRED BY CITIES FOR WORK IN CONSTRUCTING, REPAIRING, OR CLEANING STREETS—Continued

| State | Number of cities reporting | Number of cities in which hourly wage rates of street laborers were— | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Under 15 cts. | 15 and under 20 cts. | 20 and under 25 cts. | 25 and under 30 cts. | 30 and under 35 cts. | 35 and under 40 cts. | 40 and under 45 cts. | 45 and under 50 cts. | 50 and under 55 cts. | 55 and under 60 cts. | 60 and under 65 cts. | 65 and under 70 cts. | 70 and under 75 cts. | 75 and under 80 cts. | 80 and under 85 cts. |
| Illinois | 166 | | | | 1 | 10 | 16 | 32 | 10 | 39 | 12 | 14 | 10 | 3 | 17 | 2 |
| Indiana | 90 | | | | 2 | 16 | 26 | 31 | 4 | 9 | 2 | | | | | |
| Iowa | 79 | | | | 2 | 12 | 17 | 34 | 5 | 8 | | | 1 | | | |
| Kansas | 58 | | | | | | 16 | 29 | 4 | 8 | 1 | | | | | |
| Kentucky | 41 | | 1 | | 15 | 11 | 3 | 4 | 1 | 4 | 1 | 1 | | | | |
| Louisiana | 30 | 1 | 2 | 11 | 11 | 2 | 2 | 1 | | | | | | | | |
| Maine | 25 | | | | | 5 | 10 | 10 | | | | | | | | |
| Maryland | 18 | | | | 1 | 4 | 4 | 4 | 3 | 2 | | | | | | |
| Massachusetts | 165 | | | | | | 4 | 14 | 8 | 73 | 19 | 27 | 19 | 1 | | |
| Michigan | 92 | | | | | 6 | 14 | 36 | 12 | 17 | 3 | 3 | 1 | | | |
| Minnesota | 56 | | | | | 8 | 15 | 15 | 3 | 10 | 4 | 1 | | | | |
| Mississippi | 29 | | 2 | 11 | 13 | 1 | 2 | | | | | | | | | |
| Missouri | 58 | | | | 3 | 15 | 11 | 21 | 4 | 4 | | | | | | |
| Montana | 17 | | | | | | | 1 | | 5 | 4 | 6 | 1 | | | |
| Nebraska | 29 | | | | | 1 | 7 | 20 | 1 | | | | | | | |
| Nevada | 2 | | | | | | | | | 1 | 1 | | | | | |
| New Hampshire | 26 | | | | | 2 | 6 | 7 | 2 | 8 | 1 | | | | | |
| New Jersey | 114 | | | | | 2 | 1 | 9 | 9 | 44 | 16 | 20 | 10 | | 3 | |
| New Mexico | 11 | | | | 3 | 4 | 1 | 3 | | | | | | | | |
| New York | 162 | | | | | | 5 | 40 | 20 | 57 | 11 | 15 | 7 | | 7 | |
| North Carolina | 52 | | | 15 | 30 | 6 | | 1 | | | | | | | | |
| North Dakota | 12 | | | | | | 3 | 8 | 1 | | | | | | | |
| Ohio | 139 | | | | 1 | 5 | 13 | 34 | 21 | 42 | 13 | 10 | | | | |
| Oklahoma | 58 | | | | 2 | 9 | 9 | 28 | 1 | 8 | | 1 | | | | |
| Oregon | 22 | | | | | 1 | 1 | 4 | 1 | 10 | 3 | 2 | | | | |
| Pennsylvania | 292 | | | | 1 | 7 | 28 | 88 | 54 | 90 | 19 | 5 | | | | |
| Rhode Island | 21 | | | | | | 2 | 5 | 4 | 8 | 2 | | | | | |
| South Carolina | 30 | | 13 | 16 | 1 | | | | | | | | | | | |
| South Dakota | 14 | | | | | | 3 | 8 | 2 | 1 | | | | | | |
| Tennessee | 39 | | 2 | 12 | 20 | 2 | 2 | 1 | | | | | | | | |
| Texas | 106 | | 8 | 5 | 28 | 26 | 17 | 16 | 1 | 4 | | | | 1 | | |
| Utah | 15 | | | | | | 8 | 4 | | 2 | 1 | | | | | |
| Vermont | 14 | | | | | 1 | 4 | 7 | 1 | 1 | | | | | | |
| Virginia | 38 | | | | 19 | 11 | 6 | 2 | | | | | | | | |
| Washington | 33 | | | | | | | 3 | | 17 | 7 | 6 | | | | |
| West Virginia | 34 | | | | 1 | 7 | 2 | 13 | 3 | 8 | | | | | | |
| Wisconsin | 82 | | | | 3 | 6 | 28 | 20 | 10 | 10 | 3 | 2 | | | | |
| Wyoming | 8 | | | | | | | 1 | | 4 | 2 | | | 1 | | |
| Total | 2,626 | 4 | 64 | 119 | 195 | 201 | 313 | 593 | 198 | 553 | 154 | 137 | 57 | 7 | 28 | 3 |
| Per cent | 100 | (1) | 2 | 5 | 7 | 8 | 12 | 23 | 8 | 21 | 6 | 5 | 2 | (1) | 1 | (1) |

[1] Less than 1 per cent.

## Classified Weekly Hours of Labor

IN TABLE 2, classified working hours per week of unskilled street laborers are presented. The number of municipalities in each State whose laborers work each classified number of hours per week are shown, and the percentage of all municipalities whose street laborers work each specified number of hours per week are also set forth. Of the total cities and towns reporting, 1,053, or 40 per cent, had a 48-hour week and 13 per cent a working week of less than 48 hours. On the other hand, 46 per cent had a working week of over 48 hours. While the street laborers in 9 per cent of the cities worked 44 hours or less a week, in 13 per cent of the cities such laborers had a 60-hour week.

TABLE 2.—CLASSIFIED HOURS PER WEEK WORKED BY UNSKILLED COMMON LABOR HIRED BY CITIES FOR WORK IN CONSTRUCTING, REPAIRING, OR CLEANING STREETS

| State | Number of cities reporting | Number of cities having working week of— | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 44 hours | Over 44 and under 48 hours | 48 hours | Over 48 and under 54 hours | 54 hours | 55 hours | Over 55 and under 60 hours | 60 hours |
| Alabama | 33 | | 1 | 3 | 2 | 5 | 6 | 7 | 9 |
| Arizona | 15 | | | 15 | | | | | |
| Arkansas | 38 | 1 | 1 | 7 | | 8 | 5 | 2 | 14 |
| California | 103 | 25 | 3 | 73 | | 1 | | | 1 |
| Colorado | 26 | | | 25 | | | | | 1 |
| Connecticut | 30 | 4 | 1 | 9 | 9 | 7 | | | |
| Delaware | 3 | | 1 | | 1 | | | | 1 |
| District of Columbia | 1 | | | 1 | | | | | |
| Florida | 26 | 1 | 2 | 5 | 3 | 6 | 3 | 1 | 5 |
| Georgia | 54 | 1 | 1 | 1 | 8 | | 18 | 6 | 19 |
| Idaho | 20 | | | 20 | | | | | |
| Illinois | 165 | [1] 26 | 5 | 68 | 21 | 29 | 1 | | 15 |
| Indiana | 90 | 2 | 2 | 18 | 14 | 19 | 9 | 1 | 25 |
| Iowa | 78 | 3 | | 19 | 3 | 19 | | 2 | 32 |
| Kansas | 58 | 1 | | 55 | | 1 | | | 1 |
| Kentucky | 41 | [1] 6 | 1 | 7 | 5 | 10 | | | 12 |
| Louisiana | 30 | 2 | 1 | 2 | 2 | 10 | 1 | 2 | [2] 10 |
| Maine | 25 | 1 | | 5 | 2 | 17 | | | |
| Maryland | 17 | 2 | | 5 | 7 | 2 | | | 1 |
| Massachusetts | 164 | [1] 43 | 12 | 93 | 9 | 6 | 1 | | |
| Michigan | 92 | 1 | 6 | 12 | 17 | 31 | | 2 | 23 |
| Minnesota | 55 | 1 | 1 | 19 | 1 | 8 | | 1 | 24 |
| Mississippi | 30 | 1 | 1 | 5 | 3 | 6 | 1 | 4 | 9 |
| Missouri | 58 | 3 | | 23 | 5 | 15 | | 1 | 11 |
| Montana | 17 | | | 16 | | | | | 1 |
| Nebraska | 29 | | | 16 | | 2 | | | 11 |
| Nevada | 2 | | | 2 | | | | | |
| New Hampshire | 26 | | | 7 | 5 | 14 | | | |
| New Jersey | 114 | 27 | 13 | 36 | 29 | 8 | 1 | | |
| New Mexico | 11 | 2 | | 8 | 1 | | | | |
| New York | 161 | 31 | 11 | 89 | 5 | 18 | | | 7 |
| North Carolina | 52 | | | 1 | 3 | 1 | 29 | 2 | 16 |
| North Dakota | 12 | | | 6 | | | | | 6 |
| Ohio | 139 | 25 | 15 | 72 | 7 | 8 | 4 | | 8 |
| Oklahoma | 58 | [3] 1 | 1 | 54 | | | | | 2 |
| Oregon | 22 | 1 | | 21 | | | | | |
| Pennsylvania | 290 | 14 | 16 | 74 | 70 | 58 | 33 | 9 | 16 |
| Rhode Island | 21 | 2 | 1 | 3 | 6 | 8 | | | 1 |
| South Carolina | 30 | | | 1 | 4 | | 17 | 1 | 7 |
| South Dakota | 14 | | | 2 | | 6 | | | 6 |
| Tennessee | 39 | 1 | 1 | 3 | 4 | 5 | 12 | 1 | [2] 12 |
| Texas | 106 | [1] 9 | 4 | 75 | 6 | 6 | | 2 | 4 |
| Utah | 15 | | | 14 | | | | 1 | |
| Vermont | 14 | | 1 | 2 | 2 | 9 | | | |
| Virginia | 38 | 2 | 2 | 2 | 11 | 6 | 9 | 1 | 5 |
| Washington | 33 | 2 | 2 | 29 | | | | | |
| West Virginia | 34 | 1 | 2 | 9 | 5 | 12 | | | 5 |
| Wisconsin | 82 | [4] 3 | 1 | 13 | 12 | 17 | 4 | 3 | 29 |
| Wyoming | 8 | | | 8 | | | | | |
| Total | 2,619 | [5] 245 | 109 | 1,053 | 282 | 378 | 154 | 49 | [6] 349 |
| Per cent | 100 | 9 | 4 | 40 | 11 | 14 | 6 | 2 | 13 |

[1] Including 1 with less than 44 hours per week.
[2] Including 1 with more than 60 hours per week.
[3] Less than 44 hours per week.
[4] Including 2 with less than 44 hours per week.
[5] Including 7 with less than 44 hours per week.
[6] Including 2 with more than 60 hours per week.

## Wages of Seamen, 1928

THE following data showing wage rates of seamen on American and foreign vessels are from Merchant Marine Statistics, 1928, published by the Bureau of Navigation of the United States Department of Commerce.

The report states that all wages shown in the tables, except American, are from consular reports. The American figures are averages taken from reports of the shipping commissioners. The wages on foreign vessels are stated in the United States equivalents of the foreign values, taken at the exchange rate on January 1 of the year

named. When more than one rate has been reported for foreign vessels, due to length of service or other conditions, the highest is usually given in the table. On Dutch tank steamers the wages in the deck department are about 10 per cent more than those listed. The wages on American motor ships average about 10 per cent more than on steamships. On German motor ships the engineers receive $5 per month more and the other personnel in the engineering department $3 more than on steamships.

Table 1 gives the average monthly wage rates on January 1, 1928, of four typical classes of seamen for the United States and for certain important foreign countries.

TABLE 1.—AVERAGE MONTHLY WAGES OF CERTAIN CLASSES OF SEAMEN ON AMERICAN AND FOREIGN STEAM AND MOTOR CARGO VESSELS OF 5,000 GROSS TONS AND OVER, JANUARY 1, 1928

| Nationality of vessels | Able seamen | Carpenters | Chief engineers | Firemen | Nationality of vessels | Able seamen | Carpenters | Chief engineers | Firemen |
|---|---|---|---|---|---|---|---|---|---|
| American: | | | | | French | $21 | $24 | $108 | $24 |
| Private | $60 | $76 | $267 | $63 | German | 27 | 33 | 112 | 30 |
| U. S. Shipping Board | 62 | 79 | 262 | 65 | Italian | 29 | 35 | 91 | 31 |
| British | 44 | 63 | [1] 147 | 46 | Norwegian | 43 | 47 | 141 | 44 |
| Danish | 42 | 48 | 171 | 43 | Spanish | 33 | 35 | 205 | 34 |
| Dutch | 40 | 46 | 151 | 42 | Swedish | 42 | 44 | 146 | 37 |

[1] On motor vessels, $227.

Table 2 presents detailed data, similar to those given in Table 1, for all classes of seamen, as of January 1 of 1927 and 1928:

TABLE 2.—AVERAGE MONTHLY WAGES OF SEAMEN ON AMERICAN AND FOREIGN STEAM AND MOTOR CARGO VESSELS OF 5,000 GROSS TONS AND OVER, JANUARY 1, 1927 AND 1928

| Occupation | American | | | | British | | Danish | | Dutch | | French | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Private | | United States Shipping Board | | | | | | | | | |
| | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 |
| Deck department: | | | | | | | | | | | | |
| First mate | $174 | $178 | $184 | $185 | [1] $112 | [1] $112 | $144 | $140 | $111 | $111 | $79 | $79 |
| Second mate | 153 | 155 | 164 | 165 | [2] 77 | [2] 77 | 112 | 108 | 84 | 84 | 53 | 53 |
| Third mate | 137 | 140 | 149 | 150 | 58 | 59 | 64 | 62 | 54 | 54 | ---- | ---- |
| Fourth mate | 116 | 121 | 150 | 125 | 51 | 51 | 64 | 62 | ---- | ---- | ---- | ---- |
| Boatswain | 72 | 73 | 74 | 75 | 51 | 51 | 49 | 48 | 46 | 46 | 24 | 24 |
| Carpenter | 77 | 76 | 79 | 79 | 63 | 63 | 49 | 48 | 46 | 46 | 24 | 24 |
| Seaman, able | 59 | 60 | 62 | 62 | 44 | 44 | 43 | 42 | 40 | 40 | 21 | 21 |
| Seamen, ordinary | 44 | 45 | 47 | 47 | 29 | 29 | 21 | 21 | 20 | 20 | 19 | 19 |
| Engineer department: | | | | | | | | | | | | |
| Chief engineer | 268 | 267 | 263 | 262 | [3] 147 | [3] 147 | 173 | 171 | 151 | 151 | 109 | 108 |
| Second engineer | 175 | 177 | 184 | 185 | [4] 112 | [4] 112 | 128 | 126 | 103 | 103 | 77 | 77 |
| Third engineer | 154 | 156 | 164 | 165 | [5] 77 | [5] 77 | 93 | 91 | 72 | 72 | 61 | 60 |
| Fourth engineer | 138 | 141 | 149 | 150 | 58 | [6] 59 | 75 | 72 | 46 | 50 | 50 | 50 |
| Junior engineer | ---- | ---- | ---- | ---- | 51 | 51 | 49 | 53 | ---- | ---- | ---- | ---- |
| Fireman | 62 | 63 | 65 | 65 | 46 | 46 | 45 | 43 | 42 | 42 | 24 | 24 |
| Greaser | 68 | 69 | 72 | 72 | 49 | [7] 49 | 45 | 48 | 46 | 46 | 23 | 23 |
| Water tender | 68 | 70 | 72 | 72 | 49 | 49 | 45 | 43 | ---- | ---- | ---- | ---- |
| Coal passer or wiper | 52 | 53 | 58 | 58 | 44 | 44 | 30 | 29 | 34 | 34 | 21 | 21 |
| Steward department: | | | | | | | | | | | | |
| Chief steward | 125 | 122 | 122 | 120 | 71 | 71 | 80 | 78 | ---- | ---- | 28 | ---- |
| Second steward | 93 | 96 | 100 | 100 | 46 | 46 | ---- | ---- | ---- | ---- | ---- | ---- |
| Cook | 102 | 100 | 97 | 100 | 66 | 66 | 59 | 58 | ---- | 58 | 23 | 23 |
| Second cook | 81 | 78 | 81 | 79 | 43 | 43 | 29 | 29 | ---- | 52 | 16 | 16 |
| Mess steward | 47 | 47 | 48 | 48 | 40 | 40 | ---- | ---- | ---- | ---- | 19 | 19 |
| Mess boy | 41 | 42 | 42 | 42 | ---- | ---- | 11 | 11 | ---- | 10 | 8 | 9 |

[1] On the largest vessels, with superior certificate, after 3 years, $122.
[2] On the largest vessels, with superior certificate, after 3 years, $83.
[3] On motor vessels, $227.
[4] On motor vessels, $146.
[5] On motor vessels, $95.
[6] On motor vessels, $62.
[7] On motor vessels, $51.

TABLE 2.—AVERAGE MONTHLY WAGES OF SEAMEN ON AMERICAN AND FOREIGN STEAM AND MOTOR CARGO VESSELS OF 5,000 GROSS TONS AND OVER, JANUARY 1, 1927 AND 1928—Continued

| Occupation | German | | Italian | | Norwegian | | Spanish | | Swedish | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 | 1927 | 1928 |
| Deck department: | | | | | | | | | | |
| First mate | $69 | $79 | $55 | $72 | $139 | $154 | $115 | $128 | $100 | $105 |
| Second mate | 56 | 62 | 46 | 60 | 114 | 120 | 76 | 86 | 74 | 80 |
| Third mate | 42 | 48 | 39 | 54 | 88 | 93 | 65 | 73 | 59 | 60 |
| Fourth mate | 33 | 37 | 37 | ---- | 63 | 70 | ---- | ---- | ---- | ---- |
| Boatswain | 29 | 33 | 28 | 46 | 48 | 47 | 34 | 38 | 46 | 46 |
| Carpenter | 29 | 33 | 27 | 35 | 51 | 47 | 31 | 35 | 46 | 44 |
| Seaman, able | 24 | 27 | 22 | 29 | 43 | 43 | 30 | 33 | 40 | 42 |
| Seaman, ordinary | 12 | 14 | ---- | 19 | 23 | 23 | 26 | 29 | 33 | 30 |
| Engineer department: | | | | | | | | | | |
| Chief engineer | 102 | 112 | 76 | 91 | 152 | 141 | 183 | 205 | 148 | 146 |
| Second engineer | 69 | 79 | 55 | 72 | 101 | 103 | 115 | 128 | 90 | 92 |
| Third engineer | 56 | 62 | 46 | 60 | 88 | 84 | 80 | 90 | 72 | 69 |
| Fourth engineer | 42 | 48 | 39 | 54 | 63 | 70 | ---- | ---- | 55 | 55 |
| Junior engineer | 28 | 31 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Fireman | 27 | 30 | 24 | 31 | 44 | 44 | 31 | 34 | 40 | 37 |
| Greaser | 28 | 31 | 24 | ---- | ---- | 25 | 31 | 34 | 43 | 43 |
| Water tender | ---- | 31 | ---- | ---- | ---- | ---- | 34 | 38 | ---- | ---- |
| Coal passer or wiper | ---- | 26 | 22 | 28 | 25 | 25 | 26 | 29 | 28 | 24 |
| Steward department: | | | | | | | | | | |
| Chief steward | ---- | 62 | 28 | 27 | 114 | 101 | 38 | 43 | 73 | 74 |
| Second steward | ---- | 49 | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- |
| Cook | 29 | 33 | ---- | 32 | 76 | 80 | 35 | 39 | 48 | 50 |
| Second cook | ---- | 20 | 24 | 30 | ---- | ---- | ---- | ---- | 32 | ---- |
| Mess steward | 12 | 14 | 21 | 30 | ---- | ---- | 20 | 22 | ---- | ---- |
| Mess boy | 6 | 7 | 12 | 16 | 13 | 13 | 15 | 16 | ---- | 13 |

Table 3 shows the variations in the wage rates of seamen on American merchant vessels of 500 gross tons and over in 1928:

TABLE 3.—AVERAGE MONTHLY WAGES PAID ON AMERICAN MERCHANT VESSELS OF 500 GROSS TONS AND OVER IN 1928, BY DESTINATION OF VESSEL

| Occupation | Great Britain | Continental Europe | South America | West Indies, Mexico, and Central America | Atlantic and Gulf coasting trade | Asia and Australia | Pacific coasting trade | Africa | Atlantic to Pacific ports, and vice versa |
|---|---|---|---|---|---|---|---|---|---|
| Steam vessels: | | | | | | | | | |
| Able seaman | $63 | $63 | $61 | $61 | $60 | $61 | $63 | $61 | $59 |
| Boatswain | 75 | 75 | 75 | 74 | 72 | 73 | 76 | 73 | 70 |
| Carpenter | 79 | 78 | 79 | 76 | 77 | 78 | 77 | 77 | 75 |
| First mate | 184 | 183 | 182 | 178 | 174 | 183 | 168 | 183 | 179 |
| Second mate | 164 | 162 | 161 | 151 | 152 | 160 | 147 | 163 | 157 |
| Fireman | 66 | 66 | 63 | 64 | 63 | 63 | 64 | 64 | 61 |
| Trimmer | 53 | 58 | 61 | 51 | 54 | 57 | 58 | 57 | 54 |
| First engineer | 253 | 252 | 255 | 252 | 248 | 269 | 247 | 250 | 255 |
| Second engineer | 166 | 182 | 179 | 175 | 172 | 183 | 169 | 180 | 175 |
| Sailing vessels: | | | | | | | | | |
| Able seaman | ---- | ---- | 60 | 60 | 66 | 60 | 90 | ---- | 62 |
| Boatswain | ---- | ---- | 70 | 69 | 69 | 90 | ---- | ---- | 77 |
| Carpenter | ---- | ---- | ---- | ---- | ---- | ---- | ---- | ---- | 85 |
| First mate | ---- | ---- | 83 | 100 | 84 | 125 | 130 | ---- | 128 |
| Second mate | ---- | ---- | ---- | 70 | 70 | ---- | 110 | ---- | 137 |

## Wage Changes Under Recent Agreements and Awards

### Railway Clerks—Louisiana & Arkansas Railroad

THE railway clerks on the Louisiana & Arkansas Railroad have secured an increase in wages through negotiations with the management. The increase amounts to approximately 3 cents an hour, with further increases in many cases to equalize rates where inequalities existed.

### Railroad Shopmen

THE Chicago & North Western Railway has granted its shop employees an increase of 5 cents an hour, effective May 1, 1929. Negotiations were conducted by System Federation No. 12 of the Railway employees' Union.

Shop employees of the Chicago, Rock Island & Pacific Railway and the Chicago, Rock Island & Gulf Railway secured an increase in wages ranging from 2 to 5 cents an hour through the signing of an agreement between representatives of these railways and the Association of Rock Island Mechanical and Power Employees. The maximum wages under the new schedule will be 81 cents an hour. Helpers and helper apprentices receive an increase of 3 cents an hour; junior helpers, coach cleaners, power plant firemen, and other power plant employees were advanced 2 cents an hour. The increases became effective March 16, 1929.

The Denver & Rio Grande Western Railroad granted an increase in wages ranging from 1 to 5 cents an hour to its shop employees, effective April 1, 1929. First-class mechanics will receive an additional 5 cents an hour; second-class mechanics and freight-car men, 4 cents an hour; unskilled mechanics and helpers, 3 cents an hour; and apprentices 1 to 5 cents an hour.

The Erie Railroad granted an increase in wages, effective May 1, 1929, of 5 cents an hour to all shop mechanics and helpers on the system, with the exception of helpers with less than one year's experience, who were given an increase of 3 cents an hour. The employees at the Meadville shops voted that the Meadville locomotive shops should be included under the system federation agreement.

Shop employees of the Green Bay & Western Railroad, through negotiations with the management, secured an increase of 8 cents an hour, effective April 26, 1929. This increase brings the wages of the mechanics, helpers, and apprentices of all crafts up to the standard rates paid by the union roads.

The Hocking Valley Railroad granted its shop employees an increase of 5 cents an hour, effective February 16, 1929.

Shop employees on the Southern Pacific lines in Texas and Louisiana were granted an increase in wages, effective March 1, 1929. Mechanics receive an increase of 5 cents an hour; car builders and car inspectors, an increase of 4 cents; helpers, an increase of from 1 to 2 cents; and apprentices, an increase of from 1 to 4 cents an hour.

### Railroad Telegraphers—Reading Railroad

THE telegraphers on the Reading Railroad have secured increases of 2 and 3 cents an hour and a six-day work week, effective April 1, 1929.

### Train Dispatchers

THE Baltimore & Ohio Chicago Terminal granted the train dispatchers a wage increase of $10 per month effective March 16, 1929. Under the new schedule the chief dispatchers will receive $310 a month and trick dispatchers $250 a month. These men also get a two weeks' vacation, pay while on sick leave, and one day off each month.

The train dispatchers system committee on the Boston & Maine Railroad has negotiated a new wage agreement and a new schedule governing rules and working conditions, effective April 5, 1929. The new rates established are $250 a month for dispatchers with the exception of one trick at Springfield, Mass., and three tricks at Woodsville, N. H., which will pay $247.50 a month.

A new agreement with the Hocking Valley Railroad negotiated by the Train Dispatchers Association provides an increase of 38 cents a day, effective April 16, 1929, six trick positions pay $10.16 a day, or $265 a month, and three trick positions pay $9.78 a day, or $255 a month. This agreement was negotiated through the United States Board of Mediation, which was represented by T. E. Bickers.

Train dispatchers on the Minneapolis, St. Paul, & Sault Ste Marie Railroad secured an increase in wages, effective as of January 1, 1929. Trick dispatchers receive $263.92 a month. The chief train dispatchers receive $322 a month, except at Bismarck where the chief receives $317 a month. The assistant chief dispatchers are increased from $300 to $307 a month.

Train dispatchers on the Michigan Central Railroad were granted an increase in wages, establishing a maximum rate of $267.50 per month, effective April 1, 1929.

The Western Pacific Railroad granted the train dispatchers an increase of $10 per month, effective May 1, 1929. The new scale provides $265 a month for trick dispatchers, $305 a month for night chiefs, and $315 for chiefs.

By a new agreement negotiated between the train dispatchers and the New York Central lines, effective April 1, 1929, train dispatchers were granted an increase of $10 a month, thereby establishing a new maximum scale of $267.50 a month, and the provisions of the respective schedules were changed to provide for a 313-day divisor instead of the existing 306-day divisor.

### Street Railway Employees—Fort Wayne, Ind.

A NEW agreement made by Division 682 of the Amalgamated Association of Street and Electric Railway Employees secured an increase of from 5 to 7 cents an hour. The new wage rate established is 48 cents an hour for the first six months' service, 50 cents an hour for the second 6 months, 52 cents an hour for two years' service, and 55 cents an hour for those in service more than two years.

## Wages and Hours of Labor in Wyoming, 1928

IN 1928 the average wages per day for 13,022 employees in various industries in Wyoming, including professional and public service, was $5.22, and the average pay check for June, 1928, was $136.68.

For 1,065 woman workers the average wage per day, 1928, was $3.20 and the average pay check for June, 1928, was $83.59.

Detailed wage statistics taken from the sixth biennial report of the Commissioner of Labor and Statistics of Wyoming are as follows:

TABLE 1.—AVERAGE WAGES AND HOURS OF LABOR OF EMPLOYEES IN WYOMING, 1928, BY INDUSTRY

| Industry | Number employed | Wages per hour (cents) | Wages per day | Hours per day | Average pay check, June, 1928 |
|---|---|---|---|---|---|
| Railroads | 193 | 60.1 | $5.29 | 8 | $132.27 |
| Contracting and constructing | 542 | 82.1 | 6.73 | 8.2 | 169.39 |
| Farming and stock raising | 358 | 32.3 | 2.93 | 9.5 | 81.53 |
| Garages and teaming | 391 | 59.3 | 5.06 | 8.8 | 134.76 |
| Hotels and resorts | 456 | 35.6 | 3.10 | 8.7 | 90.06 |
| Launderers and dyers | 147 | 56.2 | 4.66 | 8.4 | 108.28 |
| Manufacturing | 587 | 55.4 | 4.75 | 8.8 | 126.37 |
| Mines, mills, and quarries | 2,769 | 84.7 | 6.80 | 8 | 145.30 |
| Oil fields | 1,266 | 74.7 | 7.09 | 9.5 | 201.98 |
| Oil refineries | 3,021 | 77.3 | 6.24 | 8 | 192.76 |
| Professional service | 223 | 71.3 | 5.26 | 7.8 | 134.23 |
| Public service | 557 | 62.6 | 4.76 | 7.6 | 127.73 |
| Telephone and telegraph | 369 | 60.5 | 4.82 | 8 | 125.97 |
| Trades and merchandise | 2,143 | 64.8 | 5.69 | 8.8 | 144.91 |
| Total | 13,022 | 62.6 | 5.22 | 8.4 | 136.68 |

TABLE 2.—AVERAGE WAGES AND HOURS OF LABOR OF WOMEN WORKERS, 1928, BY OCCUPATION

| Occupation | Number employed | Hours per day | Hours per week | Average wages per day | Average pay check June, 1928 |
|---|---|---|---|---|---|
| Bookkeepers | 76 | 7.5 | 45.5 | $3.86 | $98.08 |
| Cashiers | 19 | 7.3 | 46.9 | 3.32 | 84.40 |
| Clerks—Saleslades | 147 | 8 | 49.6 | 3.11 | 80.17 |
| Cooks | 41 | 8.9 | 58.8 | 2.83 | 73.21 |
| Laundry workers | 61 | 8 | 43.3 | 3.10 | 72.58 |
| Maids | 34 | 7.8 | 54.7 | 1.85 | 53.19 |
| Nurses | 19 | 10.5 | 56 | 3.70 | 103.36 |
| Operators, telephone and telegraph | 6 | 7.8 | 49.7 | 4.25 | 107.23 |
| Stenographers | 53 | 7.7 | 45.4 | 3.82 | 97.05 |
| Waitresses | 78 | 7.8 | 53.5 | 2.28 | 68.25 |
| Miscellaneous | 531 | 7.5 | 46.2 | 3.12 | 82.03 |
| Total | 1,065 | 8 | 49.9 | 3.20 | 83.59 |

## Wages in Porto Rico, 1928

IN GENERAL, in the fiscal year 1928 the economic conditions of laborers in Porto Rico occupied in cultivating and grinding sugar were similar to those reported the preceding year, according to the annual report of the Governor of Porto Rico. However, the number of laborers employed increased over 10 per cent during the year and the period of activity was longer, resulting largely from greater production. Wages also increased, in some cases reaching $14 per week.

In tobacco planting and cultivating the number of workers were very appreciably reduced. At one time approximately two-thirds of the farm laborers were unemployed. Some of them, however, were able to get jobs on the sugar plantations. There was practically no change in wages.

In the coffee-growing districts fewer men were employed and the period of active work was reduced. The wages of field laborers (men and women) ran from 60 cents to $1.25 per day. The living

conditions of these workers are very poor. Very little has been done by the land owners toward the improvement of the housing of their tenant laborers. Better dwellings are needed and more extensive allotments of land for minor crops and gardens.

In the year under review better wages were paid in the fruit districts and greater numbers were employed in fruit canning and packing. For large numbers of men and women wages ranged from 60 cents to $1.50 per day, the majority of these workers receiving more than $1.

The embroidery and needlework industry has become one of the principal Porto Rican industries, and employs, it is estimated, from 40,000 to 50,000 women and girls, among them many home workers. The earnings of these home workers are low, but are a welcome source of income. The factory employees are pieceworkers. The number of factories in this industry is growing each year, particularly at Mayaguez. Workers on private and public construction in the period covered had at least an average amount of employment.

The demand for skilled carpenters, masons, painters, plumbers, and electricians seems fairly constant and the wages paid are satisfactory. Helpers' wages are small. Those engaged in government and municipal work receive $1 per day, the minimum wage fixed by law. In private work the amount paid varies with the demand. Skilled mechanics, blacksmiths, melters, lathe operators, and welders receive from $3 to $4 per day.

Factories making cigarettes, cigars, and stripping are in the most important Porto Rican cities and towns. Production has been reduced by recent strikes.

Porto Rico is still confronted with the problems of overpopulation, among them seasonal and sectional unemployment. The following statement, however, from the above-mentioned report is encouraging:

There are more persons employed in any season in Porto Rico than ever before, and the periods of work are longer now than ever before. Wages on the whole are higher now than ever before. And these increases are decidedly greater than the percentage of the increase of population. There has been a large increase each year for the last five years in the amount of government work, in general business, and in the building of private residences. There has been an increased volume of trade. Transportation has largely increased. All this has created a constantly increasing demand for labor. It is true that in some places during certain periods there is little work and many idle. There are also places where there is at times a demand for labor and not enough laborers to supply the demand.

The governor emphasizes the need for the establishment of new industries on the island as a means of eliminating unemployment and declares that "the wages paid for labor in Porto Rico are too low."

## Wages of Skilled and Unskilled Workers in Nassau, Bahama Islands

IN 1928 unskilled workmen in Nassau were paid from 9 pence to 1 shilling (18 to 24 cents) per hour, or 6 to 8 shillings ($1.46 to $1.95) per day, while skilled workers "continued to receive" £1 ($4.87) or more per day. These figures are given in a report from the American consul, C. C. Broy, at Nassau, dated April 10, 1929, who states that wages of common labor in that colony are said to be higher than in many parts of the West Indies and are much above the average of a few years ago.

## Wages in Germany, March, 1929

THE table following shows hourly and weekly wages in 12 principal industries in Germany on March 1, 1929, according to the trade agreements in effect. The figures are compiled from the Wirtschaft und Statistik for the second half of March, 1929, published by the State Statistical Bureau, Berlin, 1929 (p. 260).

HOURLY AND WEEKLY WAGES IN 12 PRINCIPAL INDUSTRIES ON MARCH 1, 1929

[At par mark = 23.8 cents, pfennig = 0.238 cent; exchange rate about par]

| Industry | Skilled workers | | | | Unskilled workers | | | |
|---|---|---|---|---|---|---|---|---|
| | Hourly wage | | Weekly wage | | Hourly wage | | Weekly wage | |
| | In pfennigs | U. S. currency | In marks | U. S. currency | In pfennigs | U. S. currency | In marks | U. S. currency |
| Production goods: | | | | | | | | |
| Mining | 121.4 | $0.29 | 58.26 | $13.87 | 75.7 | $0.18 | 41.34 | $9.84 |
| Metal trades | 100.8 | .24 | 49.54 | 11.79 | 75.3 | .18 | 37.00 | 8.81 |
| Chemical | 103.4 | .25 | 49.63 | 11.81 | 85.5 | .20 | 41.04 | 9.77 |
| Building | 134.4 | .32 | 64.32 | 15.31 | 111.0 | .26 | 53.12 | 12.64 |
| Woodworking | 119.0 | .28 | 56.18 | 13.37 | 102.5 | .24 | 48.42 | 11.52 |
| Paper | 82.9 | .20 | 39.79 | 9.47 | 74.5 | .18 | 35.76 | 8.51 |
| Printing | 111.9 | .27 | 53.72 | 12.79 | 97.4 | .23 | 46.76 | 11.13 |
| Average | 112.6 | .27 | 54.43 | 12.95 | 83.3 | .20 | 41.72 | 9.93 |
| Consumption goods: | | | | | | | | |
| Textile, males | 78.1 | .19 | 37.49 | 8.92 | 65.8 | .16 | 31.58 | 7.52 |
| Textile, females | 57.4 | .14 | 27.55 | 6.56 | 46.4 | .11 | 22.27 | 5.30 |
| Breweries | 124.5 | .30 | 59.74 | 14.22 | 110.1 | .26 | 52.86 | 12.58 |
| Candy and chocolate | 101.4 | .24 | 48.67 | 11.58 | 87.4 | .21 | 41.95 | 9.98 |
| Cardboard, males | 92.4 | .22 | 44.35 | 10.56 | 77.8 | .19 | 37.34 | 8.89 |
| Cardboard, females | 60.5 | .14 | 29.04 | 6.91 | 49.9 | .12 | 23.95 | 5.70 |
| Average | 78.8 | .19 | 37.83 | 9.00 | 66.5 | .16 | 31.94 | 7.61 |
| Railway | 95.9 | .23 | 49.56 | 11.80 | 77.1 | .18 | 39.83 | 9.48 |
| Average, all industries | 108.2 | .26 | 52.40 | 12.47 | 81.2 | .19 | 40.56 | 9.65 |

## Wages and Hours of Labor on Banana Farms and on the Dock in Honduras, March, 1929

THE following data on wages and hours of banana-farm workers and of dock workers in the Tela consular district, Honduras, are from a report by the American vice consul, T. Monroe Fisher, of that district, dated March 30, 1929. The wage rates are given in United States currency.

*Wages on banana farms*

| | | |
|---|---|---|
| Overseer | per month | $150–$190 |
| Timekeeper | do | 100 |
| Laborer | per day | 1.25– 1.50 |

*Wages on the dock*

| | Per hour |
|---|---|
| Carrier | $0.25 and $0.35 |
| Stevedore | .35 and .50 |
| Stageman | .35 and .50 |
| Feeder | .35 and .50 |
| Winchman | .35 and .50 |
| Checker | .35 and .50 |
| Inspector | .35 and .50 |
| Foreman | .50 and .60 |

The hours of labor on the banana farms are from 6 a. m. to 5 p. m. with an hour and a half for lunch on ordinary days; on fruit-cutting days the hours are from sunrise to sunset. On the dock, the hours are from 6 a. m. to 6 p. m.

## Wages in Milan, Italy, in January, 1929

THE table below shows current hourly, daily, weekly, and overtime wages in various industries and occupations in the city of Milan, Italy, in January, 1929.

The figures are taken from the Milano Rivista Mensile del Comune di Milano (Statistical bulletin of the city of Milan) for February, 1929 (p. 127).

CURRENT HOURLY, DAILY, WEEKLY, AND OVERTIME WAGES IN VARIOUS INDUSTRIES AND OCCUPATIONS IN MILAN, ITALY, IN JANUARY, 1929

[Exchange rate of lire=5.26 cents]

| Industry and occupation | Hourly wage | Daily wage | Weekly wage | Overtime rate per hour |
|---|---|---|---|---|
| Building industry: | | | | |
| Masons | $0.181 | $1.45 | $8.71 | $0.236 |
| Carpenters | .189 | 1.51 | 9.09 | ---------- |
| Joiners | .176 | 1.41 | 8.67 | ---------- |
| Decorators, painters | .208 | 1.66 | 9.97 | .311 |
| Decorators, whitewashers | .192 | 1.54 | 9.22 | .288 |
| Unskilled workers | .118 | .947 | 5.68 | .154 |
| Metal trades: | | | | |
| Fitters | .158 | 1.27 | 7.59 | .181 |
| Molders | .170 | 1.36 | 8.17 | .187 |
| Lathe tenders | .172 | 1.38 | 8.25 | .181 |
| Unskilled workers | .126 | 1.01 | 6.04 | .145 |
| Furniture industry: | | | | |
| Cabinet makers | .206 | 1.64 | 9.86 | .237 |
| Unskilled workers | .145 | 1.16 | 6.97 | .167 |
| Typographical industry: | | | | |
| Compositors— | | | | |
| Hand | .234 | 1.87 | 11.22 | .304 |
| Linotype | .257 | 2.05 | 12.32 | .333 |
| Monotype | .252 | 2.02 | 12.13 | .328 |
| Pressmen | .231 | 1.85 | 11.07 | .300 |
| Helpers | .157 | 1.25 | 7.52 | .204 |
| Bookbinders, male | .234 | 1.87 | 11.22 | .304 |
| Bookbinders, female | .130 | 1.04 | 6.24 | .169 |
| Chemical industry: | | | | |
| Skilled workers | .140 | 1.12 | 6.72 | .161 |

## Wages in Palermo, Sicily, April, 1929

ACCORDING to a report from Consul Howard K. Travers, of Palermo, Italy, April 2, 1929, seasonal inactivity among the farmers during the winter months in Sicily has been practically annulled by the large road building program outlined by the provincial and national authorities. Farm hands in that vicinity receive about $1 per day in addition to board, lodging, and wine. Complaint is made that the young men who have attended schools in the city are generally unwilling to do manual labor, and several landholders have stated that in the interior of the island it is increasingly difficult to obtain good farm labor.

## Wages in Lithuania, 1928

A REPORT from American vice consul P. J. Reveley, Kovno, March 31, 1929, gives the following data regarding wages and salaries in Lithuania in 1928, conversions being made into United States Currency on the basis of 1 lit = 10 cents:

| | Lits | U. S. currency |
|---|---|---|
| Day laborers: | | |
| Male, per day | 4.60 | $0.46 |
| Female, per day | 3.05 | .31 |
| Private business: | | |
| Clerks, salesmen and women, per month | 300–350 | 30.00–35.00 |
| Bookkeepers and skilled clerks, per month | 700–1,000 | 70.00–100.00 |
| Government and municipal: | | |
| Ordinary clerks, per month | 350–400 | 35.00–40.00 |
| Executives, per month | 750–900 | 75.00–90.00 |
| Mail carriers and police, per month | 150–250 | 15.00–25.00 |

# TREND OF EMPLOYMENT

## Summary for April, 1929

EMPLOYMENT *increased* 0.5 per cent in April, 1929, as compared with March, and pay-roll totals *increased* 0.1 per cent, according to reports made to the Bureau of Labor Statistics.

The industrial groups surveyed, the number of establishments reporting in each group, the number of employees covered, and the total pay rolls for one week, for both March and April, together with the per cents of change in April, are shown in the following statement:

| Industry | Establishments | Employment | | Per cent of change | Pay roll in one week | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| **1. Manufacturing** | **12,501** | **3,542,538** | **3,563,150** | [1] **+0.5** | **$99,428,990** | **$100,526,951** | [1] **+0.7** |
| **2. Coal mining** | **1,364** | **316,601** | **306 898** | **−3.1** | **8,346,156** | **7,339,426** | **−12.1** |
| Anthracite | 158 | 110,984 | 114,063 | +2.8 | 3,184,169 | 3,097,110 | −2.7 |
| Bituminous | 1,206 | 205,617 | 192,835 | −6.2 | 5,161,987 | 4,242,316 | −17.8 |
| **3. Metalliferous mining** | **319** | **52,567** | **54,551** | **+3.8** | **1,625,053** | **1,715,059** | **+5.5** |
| **4. Public utilities** | **8,843** | **653,996** | **667,830** | **+2.1** | **19,657,110** | **19,735,803** | **+0.4** |
| **5. Trade** | **5,386** | **201,066** | **200,136** | **−0.5** | **5,021,101** | **5,004,246** | **−0.3** |
| Wholesale | 1,171 | 41,329 | 41,579 | +0.6 | 1,257,226 | 1,248,374 | −0.7 |
| Retail | 4,215 | 159,737 | 158,557 | −0.7 | 3,763,875 | 3,755,872 | −0.2 |
| **6. Hotels** | **1,543** | **140,825** | **139,080** | **−1.2** | [2] **2,408,366** | [2] **2,342,786** | **−2.7** |
| **Total** | **29,956** | **4,907,593** | **4,931,645** | **+0.5** | **136,486,776** | **136,664,271** | **+0.1** |

[1] Weighted per cent of change; the remaining per cents of change, including total, are unweighted.
[2] Cash payments only; see text, p. 211.

Increases in employment were shown in April in manufacturing, anthracite mining, metalliferous mining, public utilities, and wholesale trade, while bituminous coal mining, retail trade, and hotels showed decreased employment. The increase in employment in manufacturing industries is the first these industries have shown in the month of April since 1921.

For convenient reference the latest data available relating to all employees, excluding executives and officials, on Class I railroads, drawn from Interstate Commerce Commission reports, are shown in the following statement. These reports are for the months of February and March instead of for March and April; consequently the figures can not be used with those presented in the foregoing statement.

| Industry | Employment | | Per cent of change | Amount of pay roll in entire month | | Per cent of change |
|---|---|---|---|---|---|---|
| | Feb. 15, 1929 | Mar. 15, 1929 | | February, 1929 | March, 1929 | |
| **Class I railroads** | **1,589,351** | **1,611,407** | **+1.4** | **$215,173,183** | **$233,209,099** | **+8.4** |

The total number of employees included in this summary is more than 6,500,000, with pay-roll totals in one week of approximately $190,000,000.

## 1. Employment in Selected Manufacturing Industries in April, 1929

EMPLOYMENT in manufacturing industries *increased* 0.5 per cent in April, 1929, as compared with March, and pay-roll totals *increased* 0.7 per cent, this being the only time in the seven years for which the Bureau of Labor Statistics has computed indexes of employment on the present basis in which employment has been higher in April than in March and the first time in six years that pay-roll totals have been higher in April than in March.

These unusual increases for April were due not altogether to seasonal gains in such industries as fertilizer, brick, cement, lumber, and ice cream, but largely to notable increases in the iron and steel and the nonferrous-metal groups of industries caused by pronounced activities in the metal-using industries—automobiles, agricultural implements, electrical machinery, and shipbuilding.

The April, 1929, report is based on returns made by 12,460 establishments in 54 of the leading manufacturing industries of the United States. These establishments in April had 3,529,230 employees, whose combined earnings in one week were $99,814,336. These employees represent 54 per cent of all employees in the 54 industries surveyed and more than 42 per cent of the total number of employees in all manufacturing industries of the United States.

The Bureau of Labor Statistics' weighted index of employment in manufacturing industries for April, 1929, is 99.1 as compared with 98.6 for March, 1929, and 93.3 for April, 1928; the weighted index of pay-roll totals for April, 1929, is 104.6 as compared with 103.9 for March, 1929, and 93.8 for April, 1928. The monthly average for 1926 equals 100.

Manufacturing employment stood at a higher level in April, 1929, than at any time since March, 1927, and pay-roll totals were greater than at any time since November, 1923.

Thirty of the fifty-four separate industries had more employees in April than in March and 32 industries reported higher pay-roll totals.

The recently included industries, rayon and radio, which are not yet used in computing index numbers, gained 0.3 per cent and 2.1 per cent, respectively, in employment, but fell off 0.2 per cent and 2.5 per cent, respectively, in pay-roll totals.

The cotton-goods industry dropped 1.9 per cent of its employees in April, the iron and steel industry gained 1 per cent in employment, and the automobile industry gained 0.2 per cent.

Seven of the nine geographic divisions had more employees in April than in March, and eight divisions reported higher pay-roll totals, the outstanding gains having been in the western half of the United States; employment in both the New England and South Atlantic States fell off slightly, while employees' earnings decreased only in the New England States.

TABLE 1.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL MANUFACTURING ESTABLISHMENTS IN MARCH AND APRIL, 1929

| Industry | Establishments | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| **Food and kindred products** | **1,820** | **223,124** | **219,792** | (1) | **$5,739,316** | **$5,706,022** | (1) |
| Slaughtering and meat packing | 204 | 86,313 | 84,602 | −2.0 | 2,207,125 | 2,210,122 | +0.1 |
| Confectionery | 295 | 30,783 | 29,205 | −5.1 | 573,087 | 540,897 | −5.6 |
| Ice cream | 303 | 10,632 | 11,883 | +11.8 | 360,500 | 399,119 | +10.7 |
| Flour | 347 | 16,418 | 15,843 | −3.5 | 437,287 | 415,748 | −4.9 |
| Baking | 656 | 67,674 | 66,954 | −1.1 | 1,812,085 | 1,785,382 | −1.5 |
| Sugar refining, cane | 15 | 11,304 | 11,305 | +(2) | 349,232 | 354,754 | +1.6 |
| **Textiles and their products** | **2,155** | **638,573** | **631,428** | (1) | **12,882,359** | **12,506,852** | (1) |
| Cotton goods | 476 | 223,058 | 218,852 | −1.9 | 3,584,736 | 3,536,256 | −1.4 |
| Hosiery and knit goods | 340 | 97,373 | 98,012 | +0.7 | 1,894,722 | 1,921,317 | +1.4 |
| Silk goods | 288 | 67,301 | 67,693 | +0.6 | 1,475,820 | 1,479,670 | +0.3 |
| Woolen and worsted goods | 191 | 63,256 | 63,535 | +0.4 | 1,415,947 | 1,434,423 | +1.3 |
| Carpets and rugs | 29 | 25,624 | 25,541 | −0.3 | 645,499 | 643,664 | −0.3 |
| Dyeing and finishing textiles | 110 | 35,000 | 34,682 | −0.9 | 903,214 | 883,052 | −2.2 |
| Clothing, men's | 307 | 66,360 | 63,008 | −5.1 | 1,647,939 | 1,349,879 | −18.1 |
| Shirts and collars | 122 | 22,550 | 22,225 | −1.4 | 365,398 | 356,687 | −2.4 |
| Clothing, women's | 214 | 25,659 | 25,239 | −1.6 | 650,749 | 605,098 | −7.0 |
| Millinery and lace goods | 78 | 12,392 | 12,641 | +2.0 | 298,335 | 296,806 | −0.5 |
| **Iron and steel and their products** | **1,928** | **723,822** | **732,425** | (1) | **22,909,567** | **23,399,002** | (1) |
| Iron and steel | 209 | 281,809 | 284,498 | +1.0 | 9,317,929 | 9,558,428 | +2.6 |
| Cast-iron pipe | 40 | 11,463 | 11,637 | +1.5 | 258,008 | 272,294 | +5.5 |
| Structural ironwork | 166 | 25,566 | 25,710 | +0.6 | 755,680 | 773,101 | +2.3 |
| Foundry and machine-shop products | 1,072 | 276,660 | 283,011 | +2.3 | 8,727,461 | 8,974,007 | +2.8 |
| Hardware | 69 | 33,457 | 32,635 | −2.5 | 876,585 | 852,151 | −2.8 |
| Machine tools | 149 | 40,298 | 40,514 | +0.5 | 1,357,776 | 1,373,937 | +1.2 |
| Steam fittings and steam and hot-water heating apparatus | 110 | 35,048 | 34,518 | −1.5 | 1,060,186 | 1,023,837 | −3.4 |
| Stoves | 113 | 19,521 | 19,902 | +2.0 | 555,942 | 571,247 | +2.8 |
| **Lumber and its products** | **1,390** | **235,719** | **240,084** | (1) | **5,185,740** | **5,341,763** | (1) |
| Lumber, sawmills | 641 | 136,700 | 141,978 | +3.9 | 2,762,397 | 2,938,139 | +6.4 |
| Lumber, millwork | 332 | 34,658 | 34,953 | +0.9 | 823,894 | 835,331 | +1.4 |
| Furniture | 417 | 64,361 | 63,153 | −1.9 | 1,599,449 | 1,568,293 | −1.9 |
| **Leather and its products** | **444** | **134,041** | **131,045** | (1) | **2,965,274** | **2,854,760** | (1) |
| Leather | 132 | 26,230 | 26,058 | −0.7 | 653,477 | 659,453 | +0.9 |
| Boots and shoes | 312 | 107,811 | 104,987 | −2.6 | 2,311,797 | 2,195,307 | −5.0 |
| **Paper and printing** | **1,184** | **206,774** | **206,246** | (1) | **7,019,923** | **6,955,948** | (1) |
| Paper and pulp | 218 | 59,810 | 60,026 | +0.4 | 1,652,502 | 1,653,288 | +(2) |
| Paper boxes | 185 | 19,569 | 19,635 | +0.3 | 458,535 | 455,823 | −0.6 |
| Printing, book and job | 348 | 47,807 | 46,594 | −2.5 | 1,698,547 | 1,625,372 | −4.3 |
| Printing, newspapers | 433 | 79,588 | 79,991 | +0.5 | 3,210,339 | 3,221,465 | +0.3 |
| **Chemicals and allied products** | **383** | **101,413** | **105,912** | (1) | **2,913,092** | **3,054,156** | (1) |
| Chemicals | 146 | 36,433 | 36,331 | −0.3 | 1,030,040 | 1,037,096 | +0.7 |
| Fertilizers | 176 | 16,297 | 19,686 | +20.8 | 281,264 | 341,752 | +21.5 |
| Petroleum refining | 61 | 48,683 | 49,895 | +2.5 | 1,601,788 | 1,675,308 | +4.6 |
| **Stone, clay, and glass products** | **937** | **123,319** | **127,658** | (1) | **3,194,547** | **3,344,662** | (1) |
| Cement | 105 | 23,078 | 23,585 | +2.2 | 654,623 | 689,719 | +5.4 |
| Brick, tile, and terra cotta | 579 | 35,415 | 39,067 | +10.3 | 868,875 | 974,027 | +12.1 |
| Pottery | 127 | 22,034 | 21,904 | −0.6 | 536,690 | 553,109 | +3.1 |
| Glass | 126 | 42,792 | 43,102 | +0.7 | 1,134,359 | 1,127,807 | −0.6 |
| **Metal products, other than iron and steel** | **233** | **60,468** | **61,039** | (1) | **1,719,596** | **1,718,844** | (1) |
| Stamped and enameled ware | 75 | 20,600 | 20,870 | +1.3 | 519,600 | 515,532 | −0.8 |
| Brass, bronze, and copper products | 158 | 39,868 | 40,169 | +0.8 | 1,199,996 | 1,203,312 | +0.3 |
| **Tobacco products** | **257** | **63,724** | **62,987** | (1) | **1,026,557** | **1,045,282** | (1) |
| Chewing and smoking tobacco and snuff | 29 | 8,985 | 8,397 | −6.5 | 138,827 | 137,528 | −0.9 |
| Cigars and cigarettes | 228 | 54,739 | 54,590 | −0.3 | 887,730 | 907,754 | +2.3 |

(Footnotes at end of table)

TABLE 1.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL MANUFACTURING ESTABLISHMENTS IN MARCH AND APRIL, 1929—Continued

| Industry | Establishments | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| **Vehicles for land transportation** | **1,261** | **666,046** | **668,917** | (1) | **$22,790,973** | **$23,334,920** | (1) |
| Automobiles | 221 | 499,474 | 500,229 | +0.2 | 17,565,566 | 17,996,155 | +2.5 |
| Carriages and wagons | 50 | 1,549 | 1,548 | −(2) | 34,401 | 33,998 | −1.2 |
| Car building and repairing, electric-railroad | 429 | 26,226 | 25,505 | −2.7 | 822,361 | 820,068 | −0.3 |
| Car building and repairing, steam-railroad | 561 | 138,797 | 141,635 | +2.0 | 4,368,645 | 4,484,699 | +2.7 |
| **Miscellaneous industries** | **509** | **365,515** | **375,617** | (1) | **11,082,046** | **11,264,740** | (1) |
| Agricultural implements | 79 | 30,718 | 31,881 | +3.8 | 945,501 | 974,501 | +3.1 |
| Electrical machinery, apparatus, and supplies | 185 | 179,267 | 185,120 | +3.3 | 5,708,510 | 5,800,462 | +1.6 |
| Pianos and organs | 70 | 7,910 | 7,725 | −2.3 | 243,363 | 230,016 | −5.5 |
| Rubber boots and shoes | 12 | 17,212 | 16,970 | −1.4 | 398,674 | 404,299 | +1.4 |
| Automobile tires | 43 | 61,972 | 62,847 | +1.4 | 2,023,388 | 2,032,611 | +0.5 |
| Shipbuilding | 79 | 34,842 | 37,154 | +6.6 | 1,040,867 | 1,110,236 | +6.7 |
| Rayon [3] | 12 | 20,586 | 20,638 | +0.3 | 399,222 | 398,263 | −0.2 |
| Radio [3] | 29 | 13,008 | 13,282 | +2.1 | 322,521 | 314,352 | −2.5 |
| **All industries** | **12,501** | **3,542,538** | **3,563,150** | (1) | **99,428,990** | **100,526,951** | (1) |

## RECAPITULATION BY GEOGRAPHIC DIVISIONS

| GEOGRAPHIC DIVISION | | | | | | | |
|---|---|---|---|---|---|---|---|
| New England [4] | 1,486 | 413,658 | 412,369 | −0.3 | $10,530,253 | $10,433,059 | −0.9 |
| Middle Atlantic [5] | 2,880 | 917,164 | 919,832 | +0.3 | 26,878,707 | 26,987,929 | +0.4 |
| East North Central [6] | 3,161 | 1,283,140 | 1,293,603 | +0.8 | 40,952,586 | 41,618,739 | +1.6 |
| West North Central [7] | 1,131 | 177,188 | 178,333 | +0.6 | 4,579,302 | 4,639,464 | +1.3 |
| South Atlantic [8] | 1,547 | 353,239 | 353,034 | −0.1 | 7,058,663 | 7,113,988 | +0.8 |
| East South Central [9] | 621 | 135,284 | 135,762 | +0.4 | 2,585,588 | 2,635,958 | +1.9 |
| West South Central [10] | 668 | 100,825 | 102,157 | +1.3 | 2,295,829 | 2,327,393 | +1.4 |
| Mountain [11] | 226 | 31,842 | 32,538 | +2.2 | 896,127 | 921,752 | +2.9 |
| Pacific [12] | 781 | 130,198 | 135,522 | +4.1 | 3,651,935 | 3,848,669 | +5.4 |
| **All divisions** | **12,501** | **3,542,538** | **3,563,150** | (1) | **99,428,990** | **100,526,951** | (1) |

[1] The per cent of change has not been computed for the reason that the figures in the preceding columns are unweighted and refer only to the establishments reporting; for the weighted per cent of change, wherein proper allowance is made for the relative importance of the several industries, so that the figures may represent all establishments of the country in the industries here represented, see Table 2.

[2] Less than one-tenth of 1 per cent.

[3] The rayon industry was surveyed for the first time for the January–February comparison, and the radio industry for the March–April comparison, and, since the data for computing relative numbers are not yet available, these industries are not included in the bureau's indexes of employment and pay-roll totals. The total figures for all manufacturing industries given in the text, p. 196, do not include rayon or radio.

[4] Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont.

[5] New Jersey, New York, Pennsylvania.

[6] Illinois, Indiana, Michigan, Ohio, Wisconsin.

[7] Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota.

[8] Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia.

[9] Alabama, Kentucky, Mississippi, Tennessee.

[10] Arkansas, Louisiana, Oklahoma, Texas.

[11] Arizona, Colorado, Idaho, Montana, New Mexico, Nevada, Utah, Wyoming.

[12] California, Oregon, Washington.

TABLE 2.—PER CENT OF CHANGE, MARCH TO APRIL, 1929—12 GROUPS OF MANUFACTURING INDUSTRIES AND TOTAL OF ALL INDUSTRIES

[Computed from the index numbers of each group, which are obtained by weighting the index numbers of the several industries of the group, by the number of employees, or wages paid, in the industries]

| Group | Per cent of change March to April, 1929 | | Group | Per cent of change March to April, 1929 | |
|---|---|---|---|---|---|
| | Number on pay roll | Amount of pay roll | | Number on pay roll | Amount of pay roll |
| Food and kindred products | −1.5 | −0.9 | Metal products, other than iron and steel | +1.0 | (1) |
| Textiles and their products | −1.2 | −3.5 | Tobacco products | −1.1 | +2.0 |
| Iron and steel and their products | +1.2 | +2.1 | Vehicles for land transportation | +0.8 | +2.5 |
| Lumber and its products | +2.1 | +3.0 | Miscellaneous industries | +2.9 | +1.8 |
| Leather and its products | −2.3 | −3.6 | | | |
| Paper and printing | −0.5 | −1.4 | **All industries** | **+0.5** | **+0.7** |
| Chemicals and allied products | +4.5 | +4.4 | | | |
| Stone, clay, and glass products | +4.2 | +5.3 | | | |

[1] No change.

### Comparison of Employment and Pay-Roll Totals in Manufacturing Industries in April, 1929, and April, 1928

THE LEVEL of employment in manufacturing industries in April, 1929, was 6.2 per cent higher than in April, 1928, and employees' earnings were 11.5 per cent greater.

April, 1929, was the seventh successive month showing a higher level of employment than in the same month of the preceding year, the percentage of increase, which in the first of the seven months was 0.6 only, having been substantially greater in each succeeding month.

Thirty-nine of the fifty-four manufacturing industries had more employees at the end of this 12-month period than at the beginning; the outstanding increase was 36.4 per cent, in machine tools. The gains in employment in the shipbuilding, electrical machinery, agricultural implement, and automobile industries were between 30 and 25 per cent; the gains in the foundry and machine-shop products, brass products, rubber-tire, fertilizer, and petroleum refining industries were betwen 17.8 and 12.5 per cent. The iron and steel *industry* showed a gain of 4.9 per cent.

While the outstanding group increases in employment in April, 1929, over April, 1928, were in the metal and metal-using groups, the chemical group had made a substantial gain, with the paper and textile groups reporting increased employment of 1.5 per cent or more and the food and lumber groups of about one-half that amount. The leather, the stone-clay-glass, and the tobacco groups had fewer employees at the end of the 12-month period than at the beginning.

Each of the nine geographic divisions showed a considerable increase in this comparison over a year's interval, both in employment and pay-roll totals, the East North Central division leading with gains of 13.8 and 17.9 per cent in the two items.

TABLE 3.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN MANUFACTURING INDUSTRIES, APRIL, 1929, WITH APRIL, 1928

[The per cents of change for each of the 12 groups of industries and for the total of all industries are weighted in the same manner as are the per cents of change in Table 2]

| Industry | Per cent of change, April, 1929, compared with April, 1928 | |
|---|---|---|
| | Number on pay roll | Amount of pay roll |
| **Food and kindred products** | **+0.6** | **+3.1** |
| Slaughtering and meat packing | −0.5 | +2.6 |
| Confectionery | −2.1 | +3.9 |
| Ice cream | +0.8 | +2.3 |
| Flour | +1.2 | +1.4 |
| Baking | +1.7 | +2.7 |
| Sugar refining, cane | +6.4 | +11.1 |
| **Textiles and their products** | **+1.5** | **+7.4** |
| Cotton goods | −0.4 | +8.0 |
| Hosiery and knit goods | +1.8 | +10.0 |
| Silk goods | +3.8 | +6.6 |
| Woolen and worsted goods | +5.4 | +12.3 |
| Carpets and rugs | +7.2 | +10.9 |
| Dyeing and finishing textiles | +4.5 | +6.9 |
| Clothing, men's | −0.6 | +3.2 |
| Shirts and collars | +0.1 | +3.2 |
| Clothing, women's | +4.2 | +7.3 |
| Millinery and lace goods | +0.9 | +1.8 |
| **Iron and steel and their products** | **+10.9** | **+17.0** |
| Iron and steel | +4.9 | +12.6 |
| Cast-iron pipe | −8.9 | −8.6 |
| Structural ironwork | +9.8 | +10.2 |
| Foundry and machine-shop products | +17.8 | +25.2 |
| Hardware | +6.2 | +11.3 |
| Machine tools | +36.4 | +41.9 |
| Steam fittings and steam and hot-water heating apparatus | −3.4 | +0.7 |
| Stoves | +6.6 | +5.9 |
| **Lumber and its products** | **+0.8** | **+1.2** |
| Lumber, sawmills | −0.1 | −1.5 |
| Lumber, millwork | +1.5 | +1.3 |
| Furniture | +2.4 | +6.7 |
| **Leather and its products** | **−2.3** | **+1.0** |
| Leather | −6.7 | −4.1 |
| Boots and shoes | −0.7 | +4.4 |
| **Paper and printing** | **+1.7** | **+4.2** |
| Paper and pulp | +1.5 | +3.9 |
| Paper boxes | +2.0 | +6.6 |
| Printing, book and job | +3.5 | +3.2 |
| Printing, newspapers | +1.7 | +4.1 |
| **Chemicals and allied products** | **+6.2** | **+5.9** |
| Chemicals | +5.0 | +5.5 |
| Fertilizers | +12.9 | +10.3 |
| Petroleum refining | +12.5 | +12.5 |
| **Stone, clay, and glass products** | **−2.1** | **−2.4** |
| Cement | −5.8 | −7.3 |
| Brick, tile, and terra cotta | −4.2 | −4.0 |
| Pottery | +0.9 | +0.4 |
| Glass | +3.5 | +5.1 |
| **Metal products, other than iron and steel** | **+11.2** | **+21.0** |
| Stamped and enameled ware | +2.5 | +4.3 |
| Brass, bronze, and copper products | +15.6 | +27.7 |
| **Tobacco products** | **−0.3** | **+6.9** |
| Chewing and smoking tobacco and snuff | −9.0 | −2.3 |
| Cigars and cigarettes | +1.1 | +8.3 |
| **Vehicles for land transportation** | **+13.8** | **+19.6** |
| Automobiles | +25.0 | +27.4 |
| Carriages and wagons | +5.5 | +8.2 |
| Car building and repairing, electric-railroad | −6.2 | −5.3 |
| Car building and repairing, steam-railroad | +1.1 | +6.5 |
| **Miscellaneous industries** | **+22.8** | **+24.4** |
| Agricultural implements | +25.6 | +26.7 |
| Electrical machinery, apparatus, and supplies | +26.4 | +29.3 |
| Pianos and organs | −11.0 | −9.6 |
| Rubber boots and shoes | −9.1 | −8.2 |
| Automobile tires | +13.9 | +14.5 |
| Shipbuilding | +29.3 | +27.3 |
| **All industries** | **+6.2** | **+11.5** |

## RECAPITULATION BY GEOGRAPHIC DIVISIONS

| GEOGRAPHIC DIVISION[1] | | |
|---|---|---|
| New England | +3.5 | +9.8 |
| Middle Atlantic | +6.6 | +12.4 |
| East North Central | +13.8 | +17.9 |
| West North Central | +2.6 | +4.7 |
| South Atlantic | +3.1 | +9.2 |
| East South Central | +1.6 | +3.0 |
| West South Central | +5.4 | +10.3 |
| Mountain | +3.4 | +4.4 |
| Pacific | +1.1 | +1.2 |
| **All divisions** | **+6.2** | **+11.5** |

[1] See footnotes 4 to 12, p. 198.

## Per Capita Earnings in Manufacturing Industries in April, 1929

PER CAPITA EARNINGS of employees in the combined 54 manufacturing industries in April, 1929, were 0.1 per cent higher than in March, 1929, and 5 per cent higher than in April, 1928.

TABLE 4.—COMPARISON OF PER CAPITA EARNINGS, IN MANUFACTURING INDUSTRIES, APRIL, 1929, WITH MARCH, 1929, AND APRIL, 1928

| Industry | Per cent of change, April, 1929, compared with— | | Industry | Per cent of change, April 1929, compared with— | |
|---|---|---|---|---|---|
| | March, 1929 | April, 1928 | | March, 1929 | April, 1928 |
| Chewing and smoking tobacco and snuff | +6.0 | +7.5 | Furniture | −0.1 | +4.1 |
| Cast-iron pipe | +4.0 | +0.3 | Printing, newspapers | −0.2 | +2.2 |
| Pottery | +3.7 | −0.6 | Hardware | −0.3 | +4.7 |
| Cement | +3.1 | −1.5 | Paper and pulp | −0.3 | +2.3 |
| Rubber boots and shoes | +2.8 | +1.0 | Silk goods | −0.3 | +2.8 |
| Car building and repairing, electric-railroad | +2.5 | +0.8 | Baking | −0.4 | +0.8 |
| Cigars and cigarettes | +2.5 | +7.0 | Brass, bronze, and copper products | −0.5 | +10.8 |
| Lumber, sawmills | +2.4 | −1.2 | Confectionery | −0.5 | +6.1 |
| Automobiles | +2.3 | +2.0 | Agricultural implements | −0.7 | +0.7 |
| Slaughtering and meat packing | +2.2 | +3.4 | Automobile tires | −0.9 | +0.1 |
| Petroleum refining | +2.1 | [1] | Ice cream | −0.9 | +1.8 |
| Structural ironwork | +1.7 | +0.4 | Paper boxes | −0.9 | +4.5 |
| Brick, tile, and terra cotta | +1.6 | +0.1 | Shirts and collars | −0.9 | +3.4 |
| Iron and steel | +1.6 | +7.5 | Carriages and wagons | −1.1 | +2.7 |
| Leather | +1.6 | +2.9 | Glass | −1.3 | +1.3 |
| Sugar refining, cane | +1.6 | +4.3 | Dyeing and finishing textiles | −1.4 | +1.8 |
| Chemicals | +1.0 | +0.6 | Flour | −1.5 | +0.3 |
| Woolen and worsted goods | +0.9 | +6.4 | Electrical machinery, apparatus, and supplies | −1.6 | +2.2 |
| Stoves | +0.8 | −0.5 | Printing, book and job | −1.8 | −0.2 |
| Hosiery and knit goods | +0.7 | +8.1 | Steam fittings and steam and hot-water heating apparatus | −2.0 | +4.3 |
| Machine tools | +0.7 | +4.0 | Stamped and enameled ware | −2.1 | +1.9 |
| Car building and repairing, steam-railroad | +0.6 | +5.2 | Boots and shoes | −2.5 | +4.6 |
| Cotton goods | +0.6 | +8.6 | Millinery and lace goods | −2.5 | +1.0 |
| Fertilizers | +0.6 | −1.7 | Pianos and organs | −3.2 | +1.1 |
| Foundry and machine-shop products | +0.5 | +6.4 | Clothing, women's | −5.5 | +2.9 |
| Lumber, millwork | +0.5 | −0.3 | Clothing, men's | −13.7 | +3.2 |
| Carpets and rugs | +[2] | +3.4 | **All industries** | **+0.1** | **+5.0** |
| Shipbuilding | +[2] | −1.8 | | | |

[1] No change.

[2] Less than one-tenth of 1 per cent.

## Wage Changes in Manufacturing Industries

ONE HUNDRED AND SEVENTY-FOUR ESTABLISHMENTS in 26 manufacturing industries reported wage-rate increases made during the month ending April 15, 1929. These increases averaged 6.2 per cent and affected more than 16,000 employees, or 40 per cent of all employees in the establishments concerned. Eight establishments in 6 industries reported wage-rate decreases during the same period. These decreases averaged 11.1 per cent and affected 631 employees, or 59 per cent of all employees in the establishments concerned.

Eighty-four of the one hundred and seventy-four establishments reporting increases in wage rates were in the two car-building and repairing industries. These increases combined with the reports for February and March make a total of more than 41,000 employees in 195 car shops who received wage-rate increases between January 15 and April 15, 1929.

TABLE 5.—WAGE ADJUSTMENTS IN **MANUFACTURING** INDUSTRIES OCCURRING BETWEEN MARCH 15 AND APRIL 15, 1929

| Industry | Establishments | | Per cent of increase or decrease in wage rate | | Employees affected | | |
|---|---|---|---|---|---|---|---|
| | Total number reporting | Number reporting increase or decrease in wage rates | Range | Average | Total number | Per cent of employees— In establishments reporting increase or decrease in wage rates | Per cent of employees— In all establishments reporting |
| | | | *Increases* | | | | |
| Confectionery | 295 | 1 | 7.1 | 7.1 | 15 | 7 | (1) |
| Flour | 347 | 2 | 5.0–10.0 | 5.7 | 14 | 61 | (1) |
| Baking | 656 | 4 | 3.0– 7.2 | 4.6 | 86 | 11 | (1) |
| Hosiery and knit goods | 340 | 2 | 5.0–20.0 | 11.2 | 97 | 38 | (1) |
| Silk goods | 288 | 1 | 6.0 | 6.0 | 34 | 6 | (1) |
| Iron and steel | 209 | 2 | 5.1– 7.0 | 5.1 | 2,030 | 61 | 1 |
| Structural ironwork | 166 | 3 | 2.7–10.0 | 6.5 | 15 | 9 | (1) |
| Foundry and machine-shop products | 1,072 | 20 | 4.6–20.0 | 7.9 | 728 | 16 | (1) |
| Hardware | 69 | 2 | 4.0– 5.8 | 5.5 | 75 | 5 | (1) |
| Machine tools | 149 | 6 | 2.2– 9.0 | 4.7 | 86 | 15 | (1) |
| Lumber, millwork | 332 | 2 | 5.0–10.0 | 7.7 | 23 | 9 | (1) |
| Furniture | 417 | 6 | 5.0–15.0 | 8.5 | 104 | 3 | (1) |
| Paper boxes | 185 | 3 | 1.0–10.0 | 7.1 | 39 | 7 | (1) |
| Printing, book and job | 348 | 5 | 2.0–10.5 | 3.9 | 78 | 20 | (1) |
| Printing, newspapers | 433 | 7 | 1.0– 4.0 | 2.1 | 384 | 32 | (1) |
| Chemicals | 146 | 3 | 10.0–12.0 | 10.3 | 170 | 9 | (1) |
| Fertilizers | 176 | 6 | 4.3–20.0 | 12.5 | 744 | 83 | 4 |
| Petroleum refining | 61 | 1 | 10.0 | 10.0 | 30 | 6 | (1) |
| Cement | 105 | 1 | 10.0 | 10.0 | 181 | 100 | 1 |
| Brick, tile, and terra cotta | 579 | 2 | 4.4–16.7 | 11.5 | 62 | 94 | (1) |
| Glass | 126 | 3 | 8.0–15.0 | 9.7 | 37 | 4 | (1) |
| Brass, bronze, and copper products | 158 | 1 | 2.1 | 2.1 | 23 | 92 | (1) |
| Car building and repairing, electric-railroad | 429 | 3 | 4.3–12.5 | 5.1 | 143 | 92 | 1 |
| Car building and repairing, steam-railroad | 561 | 81 | 3.5– 9.3 | 5.8 | 10,774 | 66 | 8 |
| Electrical machinery, apparatus, and supplies | 185 | 5 | 5.0–10.0 | 8.3 | 191 | 15 | (1) |
| Shipbuilding | 79 | 2 | 10.0 | 10.0 | 21 | 7 | (1) |
| | | | *Decreases* | | | | |
| Cotton goods | 476 | 2 | 5.0–10.0 | 8.0 | 360 | 91 | (1) |
| Stoves | 113 | 1 | 10.0 | 10.0 | 20 | 74 | (1) |
| Lumber, sawmills | 641 | 1 | 5.0 | 5.0 | 40 | 29 | (1) |
| Boots and shoes | 312 | 2 | 15.0–16.0 | 15.8 | 71 | 25 | (1) |
| Brick, tile, and terra cotta | 579 | 1 | 10.0 | 10.0 | 10 | 17 | (1) |
| Glass | 126 | 1 | 20.0 | 20.0 | 130 | 75 | (1) |

[1] Less than one-half of 1 per cent.

## Indexes of Employment and Pay-Roll Totals in Manufacturing Industries

INDEX NUMBERS for April, 1928, and for February, March, and April, 1929, showing relatively the variation in number of persons employed and in pay-roll totals in each of the 54 manufacturing industries surveyed by the Bureau of Labor Statistics, together with general indexes for the combined 12 groups of industries, appear in Table 6.

TABLE 6.—INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN MANUFACTURING INDUSTRIES, APRIL, 1928, AND FEBRUARY, MARCH, AND APRIL, 1929

[Monthly average, 1926=100]

| Industry | Employment | | | | Pay-roll totals | | | |
|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | | 1928 | 1929 | | |
| | April | February | March | April | April | February | March | April |
| **General index** | **93.3** | **97.4** | **98.6** | **99.1** | **93.8** | **101.8** | **103.9** | **104.6** |
| **Food and kindred products** | **95.3** | **98.6** | **97.4** | **95.9** | **94.8** | **99.8** | **98.6** | **97.7** |
| Slaughtering and meat packing | 96.8 | 103.4 | 98.3 | 96.3 | 95.5 | 103.9 | 97.9 | 98.0 |
| Confectionery | 85.8 | 90.5 | 88.5 | 84.0 | 82.5 | 91.8 | 90.8 | 85.7 |
| Ice cream | 89.4 | 79.3 | 80.6 | 90.1 | 89.5 | 81.1 | 82.7 | 91.6 |
| Flour | 96.7 | 104.2 | 101.5 | 97.9 | 96.6 | 104.1 | 103.1 | 98.0 |
| Baking | 98.9 | 100.5 | 101.7 | 100.6 | 98.1 | 101.3 | 102.2 | 100.7 |
| Sugar refining, cane | 92.2 | 92.4 | 98.1 | 98.1 | 95.1 | 95.8 | 104.0 | 105.7 |
| **Textiles and their products** | **97.2** | **98.8** | **99.9** | **98.7** | **93.7** | **102.2** | **104.3** | **100.6** |
| Cotton goods | 97.1 | 99.1 | 98.6 | 96.7 | 91.4 | 100.3 | 100.1 | 98.7 |
| Hosiery and knit goods | 96.1 | 95.5 | 97.1 | 97.8 | 95.9 | 101.6 | 104.1 | 105.5 |
| Silk goods | 96.8 | 97.9 | 99.9 | 100.5 | 100.1 | 103.7 | 106.4 | 106.7 |
| Woolen and worsted goods | 91.9 | 97.6 | 96.5 | 96.9 | 87.7 | 99.6 | 97.2 | 98.5 |
| Carpets and rugs | 102.0 | 108.4 | 109.6 | 109.3 | 93.5 | 103.3 | 104.0 | 103.7 |
| Dyeing and finishing textiles | 99.8 | 104.7 | 105.2 | 104.3 | 100.5 | 110.0 | 109.8 | 107.4 |
| Clothing, men's | 89.4 | 92.2 | 93.7 | 88.9 | 77.7 | 94.8 | 97.9 | 80.2 |
| Shirts and collars | 93.0 | 92.5 | 94.4 | 93.1 | 89.9 | 91.4 | 95.1 | 92.8 |
| Clothing, women's | 110.7 | 110.9 | 117.2 | 115.3 | 108.1 | 117.0 | 124.7 | 116.0 |
| Millinery and lace goods | 102.9 | 98.4 | 101.8 | 103.8 | 105.1 | 98.8 | 107.5 | 107.0 |
| **Iron and steel and their products** | **90.5** | **97.2** | **99.2** | **100.4** | **91.8** | **102.5** | **105.2** | **107.4** |
| Iron and steel | 91.4 | 94.0 | 95.0 | 95.9 | 93.1 | 100.2 | 102.2 | 104.8 |
| Cast-iron pipe | 81.8 | 69.1 | 73.4 | 74.5 | 80.6 | 70.3 | 69.9 | 73.7 |
| Structural ironwork | 89.9 | 97.6 | 98.1 | 98.7 | 92.2 | 99.2 | 99.3 | 101.6 |
| Foundry and machine-shop products | 90.7 | 101.3 | 104.4 | 106.8 | 91.1 | 106.7 | 111.0 | 114.1 |
| Hardware | 87.5 | 94.8 | 95.3 | 92.9 | 85.9 | 99.1 | 98.4 | 95.6 |
| Machine tools | 95.1 | 124.3 | 129.0 | 129.7 | 101.5 | 138.0 | 142.3 | 144.0 |
| Steam fittings and steam and hot-water heating apparatus | 84.3 | 84.3 | 82.6 | 81.4 | 82.2 | 88.0 | 85.7 | 82.8 |
| Stoves | 86.7 | 88.4 | 90.6 | 92.4 | 84.7 | 85.2 | 87.3 | 89.7 |
| **Lumber and its products** | **87.3** | **85.5** | **86.2** | **88.0** | **88.3** | **84.9** | **86.8** | **89.4** |
| Lumber, sawmills | 86.5 | 82.1 | 83.1 | 86.4 | 88.5 | 80.1 | 82.0 | 87.2 |
| Lumber, millwork | 85.5 | 83.6 | 86.0 | 86.8 | 86.5 | 81.1 | 86.4 | 87.6 |
| Furniture | 90.7 | 95.4 | 94.6 | 92.9 | 88.9 | 97.0 | 96.7 | 94.9 |
| **Leather and its products** | **91.8** | **93.1** | **91.8** | **89.7** | **84.2** | **91.2** | **88.2** | **85.0** |
| Leather | 95.8 | 91.3 | 90.0 | 89.4 | 93.2 | 92.0 | 88.6 | 89.4 |
| Boots and shoes | 90.4 | 93.5 | 92.2 | 89.8 | 80.2 | 91.0 | 88.1 | 83.7 |
| **Paper and printing** | **97.9** | **100.4** | **100.1** | **99.6** | **100.7** | **104.7** | **106.4** | **104.9** |
| Paper and pulp | 93.9 | 95.0 | 95.0 | 95.3 | 94.7 | 98.5 | 98.4 | 98.4 |
| Paper boxes | 91.1 | 92.6 | 92.6 | 92.9 | 94.5 | 99.1 | 101.3 | 100.7 |
| Printing, book and job | 96.5 | 102.9 | 102.5 | 99.9 | 100.5 | 105.3 | 108.4 | 103.7 |
| Printing, newspapers | 105.3 | 107.0 | 106.6 | 107.1 | 107.5 | 110.0 | 111.5 | 111.9 |
| **Chemicals and allied products** | **101.5** | **97.3** | **103.2** | **107.8** | **101.0** | **99.5** | **102.5** | **107.0** |
| Chemicals | 99.7 | 106.1 | 105.0 | 104.7 | 104.2 | 110.2 | 109.1 | 109.9 |
| Fertilizers | 148.4 | 95.1 | 138.6 | 167.5 | 138.0 | 90.2 | 125.3 | 152.2 |
| Petroleum, refining | 82.4 | 88.3 | 90.4 | 92.7 | 85.9 | 90.9 | 92.4 | 96.6 |
| **Stone, clay, and glass products** | **89.4** | **81.7** | **84.0** | **87.5** | **89.9** | **79.6** | **83.3** | **87.7** |
| Cement | 86.2 | 77.5 | 79.5 | 81.2 | 88.1 | 74.1 | 77.5 | 81.7 |
| Brick, tile, and terra cotta | 83.9 | 70.2 | 72.9 | 80.4 | 81.6 | 65.2 | 69.9 | 78.3 |
| Pottery | 95.6 | 95.4 | 97.1 | 96.5 | 96.5 | 92.7 | 94.0 | 96.9 |
| Glass | 93.4 | 93.9 | 96.0 | 96.7 | 95.2 | 96.8 | 100.7 | 100.1 |
| **Metal products, other than iron and steel** | **92.5** | **100.7** | **101.9** | **102.9** | **92.8** | **109.4** | **112.3** | **112.3** |
| Stamped and enameled ware | 92.0 | 91.4 | 93.0 | 94.3 | 93.8 | 95.7 | 98.6 | 97.8 |
| Brass, bronze, and copper products | 92.6 | 105.1 | 106.1 | 107.0 | 92.4 | 114.8 | 117.7 | 118.0 |
| **Tobacco products** | **93.5** | **94.2** | **94.2** | **93.2** | **85.1** | **87.2** | **89.2** | **91.0** |
| Chewing and smoking tobacco and snuff | 96.8 | 96.2 | 94.3 | 88.1 | 91.2 | 96.0 | 89.9 | 89.1 |
| Cigars and cigarettes | 92.9 | 93.9 | 94.2 | 93.9 | 84.2 | 86.1 | 89.1 | 91.2 |

TABLE 6.—INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN MANUFACTURING INDUSTRIES, APRIL, 1928, AND FEBRUARY, MARCH, AND APRIL, 1929—Continued

| Industry | Employment | | | | Pay-roll totals | | | |
|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | | 1928 | 1929 | | |
| | April | February | March | April | April | February | March | April |
| **Vehicles for land transportation** | **94.7** | **105.6** | **106.9** | **107.8** | **100.4** | **114.8** | **117.2** | **120.1** |
| Automobiles | 107.6 | 132.5 | 134.2 | 134.5 | 116.0 | 143.3 | 144.2 | 147.8 |
| Carriages and wagons | 76.6 | 71.0 | 80.8 | 80.8 | 79.7 | 75.6 | 87.2 | 86.2 |
| Car building and repairing, electric-railroad | 97.3 | 90.5 | 93.8 | 91.3 | 99.8 | 91.3 | 94.8 | 94.5 |
| Car building and repairing, steam-railroad | 84.4 | 82.8 | 83.6 | 85.3 | 88.0 | 87.6 | 91.3 | 93.7 |
| **Miscellaneous industries** | **90.0** | **104.6** | **107.4** | **110.5** | **92.1** | **107.3** | **112.6** | **114.6** |
| Agricultural implements | 106.9 | 126.8 | 129.4 | 134.3 | 112.7 | 134.3 | 138.5 | 142.8 |
| Electrical machinery, apparatus, and supplies | 89.4 | 106.1 | 109.4 | 113.0 | 91.0 | 108.0 | 115.8 | 117.7 |
| Pianos and organs | 79.2 | 74.3 | 72.1 | 70.5 | 73.6 | 69.0 | 70.3 | 66.5 |
| Rubber boots and shoes | 102.3 | 96.1 | 94.3 | 93.0 | 101.2 | 91.0 | 91.6 | 92.9 |
| Automobile tires | 99.2 | 109.5 | 111.4 | 113.0 | 103.6 | 117.8 | 118.0 | 118.6 |
| Shipbuilding | 83.3 | 94.3 | 101.1 | 107.7 | 86.2 | 96.2 | 102.8 | 109.7 |

Table 7 shows the general index of employment in manufacturing industries and the general index of pay-roll totals, by months, from January, 1923, to April, 1929.

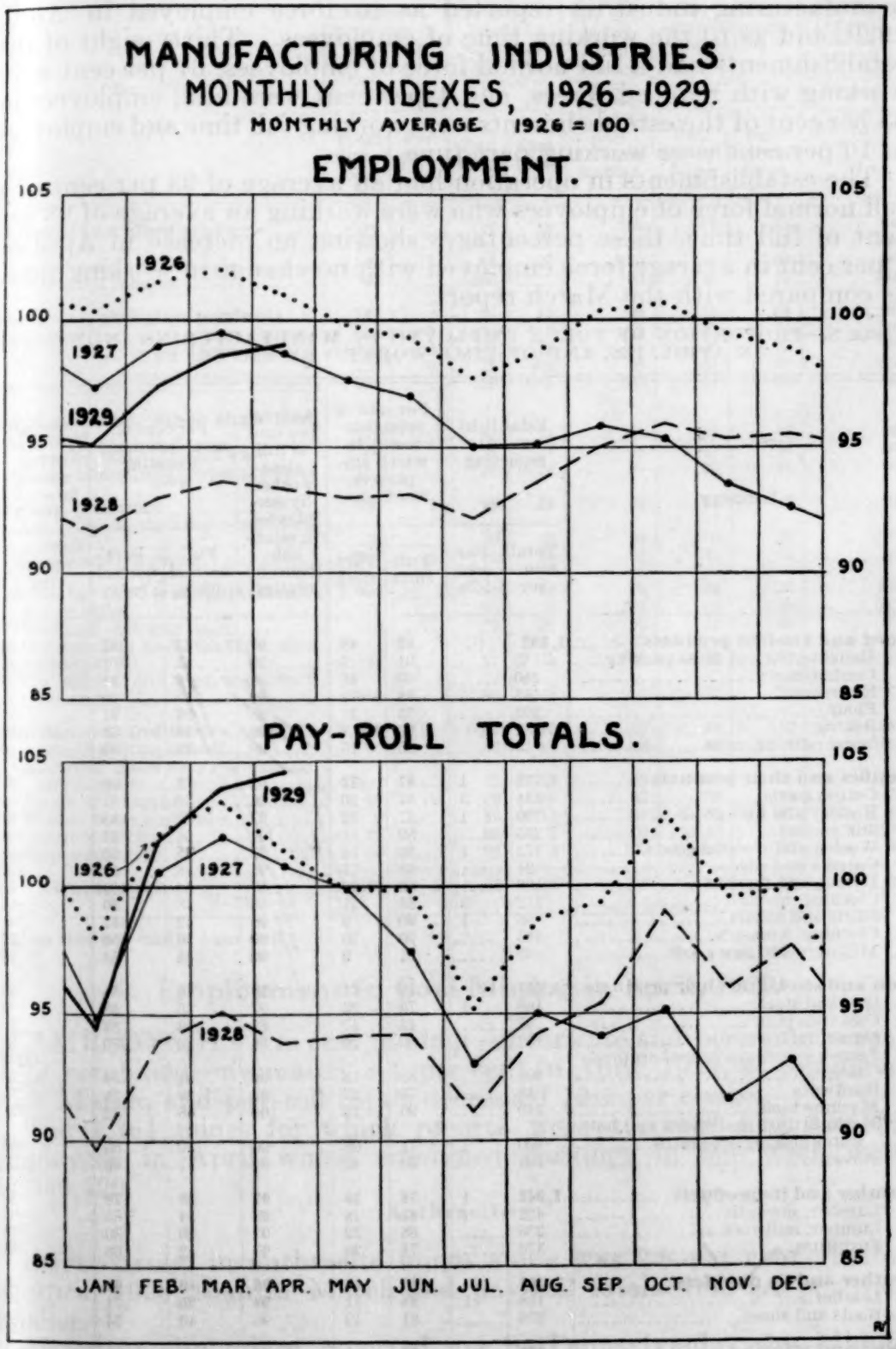
Following Table 7 is a chart which represents the 54 industries combined and shows, by months, the course of pay-roll totals as well as the course of employment. It includes the years 1926 and 1927, as well as 1928, and January, February, March, and April, 1929.

TABLE 7.—GENERAL INDEXES OF EMPLOYMENT AND PAY-ROLL TOTALS IN MANUFACTURING INDUSTRIES, JANUARY, 1923, TO APRIL, 1929

[Monthly average, 1926=100]

| Month | Employment | | | | | | | Pay-roll totals | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
| January | 106.6 | 103.8 | 97.9 | 100.4 | 97.3 | 91.6 | 95.2 | 95.8 | 98.6 | 93.9 | 98.0 | 94.9 | 89.6 | 94.5 |
| February | 108.4 | 105.1 | 99.7 | 101.5 | 99.0 | 93.0 | 97.4 | 99.4 | 103.8 | 99.3 | 102.2 | 100.6 | 93.9 | 101.8 |
| March | 110.8 | 104.9 | 100.4 | 102.0 | 99.5 | 93.7 | 98.6 | 104.7 | 103.3 | 100.8 | 103.4 | 102.0 | 95.2 | 103.9 |
| April | 110.8 | 102.8 | 100.2 | 101.0 | 98.6 | 93.3 | 99.1 | 105.7 | 101.1 | 98.3 | 101.5 | 100.8 | 93.8 | 104.6 |
| May | 110.8 | 98.8 | 98.9 | 99.8 | 97.6 | 93.0 | ..... | 109.4 | 96.5 | 98.5 | 99.8 | 99.8 | 94.1 | ..... |
| June | 110.9 | 95.6 | 98.0 | 99.3 | 97.0 | 93.1 | ..... | 109.3 | 90.8 | 95.7 | 99.7 | 97.4 | 94.2 | ..... |
| July | 109.2 | 92.3 | 97.2 | 97.7 | 95.0 | 92.2 | ..... | 104.3 | 84.3 | 93.5 | 95.2 | 93.0 | 91.2 | ..... |
| August | 108.5 | 92.5 | 97.8 | 98.7 | 95.1 | 93.6 | ..... | 103.7 | 87.2 | 95.4 | 98.7 | 95.0 | 94.2 | ..... |
| September | 108.6 | 94.3 | 98.9 | 100.3 | 95.8 | 95.0 | ..... | 104.4 | 89.8 | 94.4 | 99.3 | 94.1 | 95.4 | ..... |
| October | 108.1 | 95.6 | 100.4 | 100.7 | 95.3 | 95.9 | ..... | 106.8 | 92.4 | 100.4 | 102.9 | 95.2 | 99.0 | ..... |
| November | 107.4 | 95.5 | 100.7 | 99.5 | 93.5 | 95.4 | ..... | 105.4 | 91.4 | 100.4 | 99.6 | 91.6 | 96.1 | ..... |
| December | 105.4 | 97.3 | 100.8 | 98.9 | 92.6 | 95.5 | ..... | 103.2 | 95.7 | 101.6 | 99.8 | 93.2 | 97.7 | ..... |
| **Average** | **108.8** | **98.2** | **99.2** | **100.0** | **96.4** | **93.8** | [1] **97.6** | **104.3** | **94.6** | **97.7** | **100.0** | **96.5** | **94.5** | [1] **101.2** |

[1] Average for 4 months.


MANUFACTURING INDUSTRIES.
MONTHLY INDEXES, 1926-1929.
MONTHLY AVERAGE 1926 = 100.
EMPLOYMENT.
105
100
95
90
85
1926
1927
1929
1928
PAY-ROLL TOTALS.
105
100
95
90
85
1926
1927
1929
1928
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.

## Force Employed in Manufacturing Industries in April, 1929, and Time Worked by Employees

TEN THOUSAND ONE HUNDRED AND TWO ESTABLISHMENTS in the 54 manufacturing industries reported as to force employed in April, 1929, and as to the working time of employees. Thirty-eight of the establishments had a full normal force of employees, 61 per cent were working with reduced forces, and 1 per cent were idle; employees in 83 per cent of the establishments were working full time and employees in 16 per cent were working part time.

The establishments in operation had an average of 93 per cent of a full normal force of employees who were working an average of 98 per cent of full time, these percentages showing an increase in April of 1 per cent in average force employed with no change in working time, as compared with the March report.

TABLE 8.—PROPORTION OF FORCE EMPLOYED IN MANUFACTURING INDUSTRIES IN APRIL, 1929, AND OF TIME WORKED BY EMPLOYEES

| Industry | Establishments reporting | | Per cent of establishments in which employees worked— | | Average per cent of full time worked by employees in establishments operating | Per cent of establishments operating with— | | Average per cent of full normal force employed in establishments operating |
|---|---|---|---|---|---|---|---|---|
| | Total number | Per cent idle | Full time | Part time | | Full normal force | Part normal force | |
| **Food and kindred products** | **1,392** | (1) | **82** | **18** | **97** | **32** | **67** | **85** |
| Slaughtering and meat packing | 152 | ------ | 91 | 9 | 99 | 43 | 57 | 88 |
| Confectionery | 240 | ------ | 60 | 40 | 94 | 9 | 91 | 68 |
| Ice cream | 163 | 1 | 88 | 11 | 99 | 9 | 90 | 72 |
| Flour | 292 | ------ | 73 | 27 | 95 | 39 | 61 | 89 |
| Baking | 532 | (1) | 92 | 7 | 99 | 44 | 56 | 94 |
| Sugar refining, cane | 13 | ------ | 85 | 15 | 98 | 31 | 69 | 90 |
| **Textiles and their products** | **1,772** | **1** | **87** | **12** | **98** | **42** | **56** | **91** |
| Cotton goods | 434 | 3 | 87 | 10 | 96 | 36 | 61 | 88 |
| Hosiery and knit goods | 290 | 1 | 87 | 12 | 97 | 41 | 58 | 94 |
| Silk goods | 255 | ------ | 89 | 11 | 102 | 56 | 44 | 104 |
| Woolen and worsted goods | 173 | 1 | 86 | 14 | 97 | 35 | 65 | 85 |
| Carpets and rugs | 24 | ------ | 83 | 17 | 98 | 46 | 54 | 107 |
| Dyeing and finishing | 100 | ------ | 80 | 20 | 97 | 36 | 64 | 92 |
| Clothing, men's | 212 | 3 | 86 | 11 | 98 | 38 | 59 | 88 |
| Shirts and collars | 86 | 1 | 90 | 9 | 98 | 52 | 47 | 97 |
| Clothing, women's | 143 | ------ | 90 | 10 | 99 | 50 | 50 | 97 |
| Millinery and lace goods | 55 | ------ | 91 | 9 | 99 | 44 | 56 | 95 |
| **Iron and steel, and their products** | **1,657** | (1) | **78** | **21** | **98** | **40** | **60** | **93** |
| Iron and steel | 168 | 1 | 76 | 23 | 97 | 36 | 63 | 90 |
| Cast-iron pipe | 37 | ------ | 43 | 57 | 82 | 16 | 84 | 72 |
| Structural ironwork | 152 | 1 | 80 | 20 | 98 | 29 | 70 | 90 |
| Foundry and machine-shop products | 908 | ------ | 82 | 18 | 99 | 41 | 59 | 96 |
| Hardware | 48 | ------ | 73 | 27 | 97 | 29 | 71 | 89 |
| Machine tools | 140 | ------ | 90 | 10 | 102 | 68 | 32 | 121 |
| Steam fittings and steam and hot-water heating apparatus | 100 | 1 | 71 | 28 | 96 | 39 | 60 | 85 |
| Stoves | 104 | ------ | 58 | 42 | 91 | 31 | 69 | 90 |
| **Lumber and its products** | **1,042** | **1** | **74** | **25** | **97** | **30** | **70** | **85** |
| Lumber, sawmills | 422 | 1 | 81 | 18 | 98 | 34 | 65 | 85 |
| Lumber, millwork | 250 | ------ | 68 | 32 | 97 | 20 | 80 | 78 |
| Furniture | 370 | ------ | 71 | 29 | 97 | 32 | 68 | 89 |
| **Leather and its products** | **394** | (1) | **83** | **17** | **96** | **40** | **60** | **87** |
| Leather | 118 | 1 | 88 | 11 | 98 | 25 | 74 | 80 |
| Boots and shoes | 276 | ------ | 81 | 19 | 96 | 46 | 54 | 89 |
| **Paper and printing** | **939** | ------ | **91** | **9** | **99** | **53** | **47** | **97** |
| Paper and pulp | 174 | ------ | 89 | 11 | 99 | 34 | 66 | 94 |
| Paper boxes | 164 | ------ | 74 | 26 | 97 | 29 | 71 | 86 |
| Printing, book and job | 283 | ------ | 97 | 3 | 100 | 50 | 50 | 101 |
| Printing, newspapers | 318 | ------ | 97 | 3 | 100 | 78 | 22 | 102 |

[1] Less than one-half of 1 per cent.

TABLE 8.—PROPORTION OF FORCE EMPLOYED IN MANUFACTURING INDUSTRIES IN APRIL, 1929, AND OF TIME WORKED BY EMPLOYEES—Continued

| Industry | Establishments reporting | | Per cent of establishments in which employees worked— | | Average per cent of full time worked by employees in establishments operating | Per cent of establishments operating with— | | Average per cent of full normal force employed in establishments operating |
|---|---|---|---|---|---|---|---|---|
| | Total number | Per cent idle | Full time | Part time | | Full normal force | Part normal force | |
| **Chemical and allied products** | **316** | | **88** | **12** | **100** | **47** | **53** | **90** |
| Chemicals | 109 | | 94 | 6 | 99 | 51 | 49 | 96 |
| Fertilizers | 167 | | 80 | 20 | 100 | 50 | 50 | 96 |
| Petroleum refining | 40 | | 100 | | 100 | 25 | 75 | 84 |
| **Stone, clay, and glass products** | **732** | **2** | **85** | **13** | **98** | **32** | **66** | **86** |
| Cement | 88 | 1 | 95 | 3 | 99 | 25 | 74 | 76 |
| Brick, tile, and terra cotta | 422 | 4 | 82 | 14 | 98 | 26 | 70 | 82 |
| Pottery | 120 | 1 | 78 | 22 | 96 | 51 | 48 | 92 |
| Glass | 102 | | 95 | 5 | 100 | 39 | 61 | 93 |
| **Metal products, other than iron and steel** | **175** | | **87** | **13** | **99** | **42** | **58** | **95** |
| Stamped and enameled ware | 64 | | 89 | 11 | 98 | 47 | 53 | 94 |
| Brass, bronze, and copper products | 111 | | 86 | 14 | 99 | 39 | 61 | 96 |
| **Tobacco products** | **239** | **5** | **60** | **35** | **95** | **34** | **60** | **91** |
| Chewing and smoking tobacco and snuff | 28 | | 50 | 50 | 94 | 50 | 50 | 84 |
| Cigars and cigarettes | 211 | 6 | 61 | 33 | 95 | 32 | 62 | 92 |
| **Vehicles for land transportation** | **1,064** | | **88** | **12** | **99** | **30** | **70** | **101** |
| Automobiles | 174 | | 95 | 5 | 101 | 52 | 48 | 115 |
| Carriages and wagons | 46 | | 72 | 28 | 96 | 15 | 85 | 73 |
| Car building and repairing, electric-railroad | 328 | | 87 | 13 | 100 | 34 | 66 | 86 |
| Car building and repairing, steam-railroad | 516 | | 89 | 11 | 99 | 21 | 79 | 81 |
| **Miscellaneous industries** | **380** | (1) | **84** | **15** | **98** | **48** | **52** | **102** |
| Agricultural implements | 65 | | 85 | 15 | 99 | 42 | 58 | 117 |
| Electrical machinery, apparatus, and supplies | 142 | | 87 | 13 | 99 | 63 | 37 | 102 |
| Pianos and organs | 59 | 2 | 59 | 39 | 92 | 20 | 78 | 75 |
| Rubber boots and shoes | 9 | | 89 | 11 | 99 | 33 | 67 | 88 |
| Automobile tires | 37 | | 95 | 5 | 100 | 43 | 57 | 107 |
| Shipbuilding | 68 | | 96 | 4 | 100 | 50 | 50 | 95 |
| **All industries** | **10,102** | **1** | **83** | **16** | **98** | **38** | **61** | **93** |

[1] Less than one-half of 1 per cent.

## 2. Employment in Coal Mining in April, 1929

EMPLOYMENT in coal mining—anthracite and bituminous coal combined—decreased 3.1 per cent in April, 1929, as compared with March, and pay-roll totals decreased 12.1 per cent.

The 1,364 mines for which reports were received had 306,898 employees in April whose combined earnings in one week were $7,339,426.

### Anthracite

EMPLOYMENT in anthracite mines alone was 2.8 per cent greater in April, 1929, than in March and pay-roll totals were 2.7 per cent smaller.

All anthracite mines reported are in Pennsylvania—the Middle Atlantic division. The details for April and March are shown in Table 1.

TABLE 1.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL **ANTHRACITE** MINES IN MARCH AND APRIL, 1929

| Geographic division | Mines | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| **Middle Atlantic** [1] | **158** | **110,984** | **114,063** | **+2.8** | **$3,184,169** | **$3,097,110** | **−2.7** |

[1] See footnote 5, p. 198.

### Bituminous Coal

EMPLOYMENT in bituminous coal mines was 6.2 per cent lower in April, 1929, than in March, and pay-roll totals were 17.8 per cent lower. These figures are based upon reports from 1,206 mines in which there were in April 192,835 employees whose combined earnings in one week were $4,242,316.

There were seasonal decreases in employment in April in each of the eight geographic divisions from which bituminous coal mining employment was reported, and decreases in employees' earnings in every division except the Pacific, in which, despite a drop in number of employees, there was a considerable increase in pay-roll totals caused by a greater number of days of operation in April than in March in more than one-half of the mines reported.

The outstanding decreases were approximately 40 and 55 per cent in the two items, respectively, in the West South Central division, where there was little market for domestic coal in April.

The details for each geographic division are shown in Table 2.

TABLE 2.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL **BITUMINOUS COAL** MINES IN MARCH AND APRIL, 1929

| Geographic division [1] | Mines | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| New England | | | | | | | |
| Middle Atlantic | 353 | 62,052 | 59,231 | −4.5 | $1,582,568 | $1,420,654 | −10.2 |
| East North Central | 191 | 36,585 | 33,670 | −8.0 | 954,681 | 688,782 | −27.9 |
| West North Central | 56 | 5,134 | 4,214 | −17.9 | 130,978 | 82,756 | −36.8 |
| South Atlantic | 270 | 44,154 | 41,946 | −5.0 | 1,098,056 | 886,106 | −19.3 |
| East South Central | 228 | 43,607 | 41,777 | −4.2 | 942,457 | 825,484 | −12.4 |
| West South Central | 19 | 1,600 | 962 | −39.9 | 42,048 | 18,952 | −54.9 |
| Mountain | 78 | 10,924 | 9,598 | −12.1 | 366,288 | 269,931 | −26.3 |
| Pacific | 11 | 1,561 | 1,437 | −7.9 | 44,911 | 49,651 | +10.6 |
| **All divisions** | **1,206** | **205,617** | **192,835** | **−6.2** | **5,161,987** | **4,242,316** | **−17.8** |

[1] See footnotes 4 to 12, p. 198.

## 3. Employment in Metalliferous Mining in April, 1929

EMPLOYMENT in metalliferous mining was 3.8 per cent greater in April, 1929, than in March, and pay-roll totals were 5.5 per cent higher. These percentages are based on returns from 319 mines which in April had 54,551 employees whose combined earnings in one week were $1,715,059.

Increases both in employment and in pay-roll totals were shown in four of the six geographic divisions represented in metalliferous mining. In the East North Central and Mountain States the

increases in employees' earnings were much more pronounced than the increases in employment owing to an increased wage rate in copper mining.

The details for each geographic division are shown in the following table:

COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL **METALLIFEROUS** MINES IN MARCH AND APRIL, 1929

| Geographic division [1] | Mines | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| New England | | | | | | | |
| Middle Atlantic | | | | | | | |
| East North Central | 38 | 10,337 | 10,548 | +2.0 | $269,631 | $284,828 | +5.6 |
| West North Central | 45 | 6,690 | 6,995 | +4.6 | 208,853 | 209,707 | +0.4 |
| South Atlantic | | | | | | | |
| East South Central | 10 | 3,359 | 3,348 | −0.3 | 67,145 | 64,312 | −4.2 |
| West South Central | 68 | 4,355 | 5,085 | +16.8 | 117,413 | 128,663 | +9.6 |
| Mountain | 134 | 25,927 | 26,710 | +3.0 | 897,625 | 965,762 | +7.6 |
| Pacific | 24 | 1,899 | 1,865 | −1.8 | 64,386 | 61,787 | −4.0 |
| **All divisions** | **319** | **52,567** | **54,551** | **+3.8** | **1,625,053** | **1,715,059** | **+5.5** |

[1] See footnotes 4 to 12, p. 198.

## 4. Employment in Public Utilities in April, 1929

EMPLOYMENT in public utilities increased 2.1 per cent in April, 1929, as compared with March, although pay-roll totals increased 0.4 per cent only.

Each of the 9 geographic divisions showed more employees in April than in March, this being a seasonal gain due to the spring opportunity for out-of-door activities and the consequent taking-on of common laborers, whose rates of pay are low as compared with those of the regular forces of skilled men. The notable gains were in the South Central, Mountain, and Pacific States.

Reports were received from 8,843 establishments having in April 667,830 employees whose combined earnings in one week were $19,735,803.

The establishments reporting include electric railway, electric power and light, gas, water, telephone, and telegraph companies.

Details for each geographic division are shown in the table following.

COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL **PUBLIC UTILITIES** ESTABLISHMENTS IN MARCH AND APRIL, 1929

| Geographic division [1] | Establishments | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| New England | 327 | 35,174 | 35,695 | +1.5 | $1,165,303 | $1,177,003 | +1.0 |
| Middle Atlantic | 1,484 | 195,812 | 199,998 | +2.1 | 6,296,563 | 6,273,034 | −0.4 |
| East North Central | 1,485 | 169,583 | 172,259 | +1.6 | 5,239,840 | 5,272,109 | +0.6 |
| West North Central | 1,333 | 66,856 | 68,333 | +2.2 | 1,835,098 | 1,855,903 | +1.1 |
| South Atlantic | 843 | 55,569 | 56,233 | +1.2 | 1,565,578 | 1,578,545 | +0.8 |
| East South Central | 689 | 20,471 | 21,285 | +4.0 | 482,974 | 489,344 | +1.3 |
| West South Central | 987 | 36,805 | 37,906 | +3.0 | 895,020 | 904,799 | +1.1 |
| Mountain | 558 | 17,032 | 17,564 | +3.1 | 443,340 | 447,633 | +1.0 |
| Pacific | 1,137 | 56,694 | 58,557 | +3.3 | 1,733,394 | 1,737,433 | +0.2 |
| **All divisions** | **8,843** | **653,996** | **667,830** | **+2.1** | **19,657,110** | **19,735,803** | **+0.4** |

[1] See footnotes 4 to 12, p. 198.

## 5. Employment in Wholesale and Retail Trade in April, 1929

EMPLOYMENT in 5,386 establishments—wholesale and retail trade combined—decreased 0.5 per cent in April, 1929, as compared with March, and pay-roll totals decreased 0.3 per cent. These establishments in April had 200,136 employees with total pay rolls in one week of $5,004,246.

The establishments reporting are so carefully selected, from every State and from nearly every class of wholesale and retail trade, as to be reasonably representative of general conditions in each geographic division and, consequently, in the United States as a whole.

### Wholesale Trade

EMPLOYMENT in wholesale trade in April was 0.6 per cent greater than in March, but pay-roll totals were 0.7 per cent lower, as shown by reports from 1,171 establishments having in April 41,579 employees whose combined earnings in one week were $1,248,374.

The details by geographic divisions are shown in Table 1.

TABLE 1.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL **WHOLESALE TRADE** ESTABLISHMENTS IN MARCH AND APRIL, 1929

| Geographic division [1] | Establishments | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| New England | 79 | 2,209 | 2,190 | −0.9 | $66,988 | $66,415 | −0.9 |
| Middle Atlantic | 219 | 8,272 | 8,316 | +0.5 | 262,148 | 262,967 | +0.3 |
| East North Central | 153 | 8,287 | 8,234 | −0.6 | 253,518 | 248,536 | −2.0 |
| West North Central | 154 | 7,884 | 8,048 | +2.1 | 227,504 | 228,961 | +0.6 |
| South Atlantic | 205 | 3,300 | 3,382 | +2.5 | 96,010 | 96,634 | +0.6 |
| East South Central | 41 | 1,397 | 1,384 | −0.9 | 41,381 | 41,067 | −0.8 |
| West South Central | 88 | 3,666 | 3,660 | −0.2 | 104,250 | 102,447 | −1.7 |
| Mountain | 42 | 921 | 935 | +1.5 | 30,499 | 30,730 | +0.8 |
| Pacific | 190 | 5,393 | 5,430 | +0.7 | 174,928 | 170,617 | −2.5 |
| **All divisions** | **1,171** | **41,329** | **41,579** | **+0.6** | **1,257,226** | **1,248,374** | **−0.7** |

[1] See footnotes 4 to 12, p. 198.

### Retail Trade

EMPLOYMENT and pay-roll totals in retail trade decreased 0.7 and 0.2 per cent, respectively, in April, 1929, as compared with March, as shown by returns from 4,215 establishments which in April had 158,557 employees whose combined earnings in one week were $3,755,872.

The New England and Pacific geographic divisions each reported slightly increased employment, while decreased employment appeared in all other divisions, the decreases ranging from 0.4 per cent in the Middle Atlantic division to 6.1 per cent in the East South Central division.

Details for each geographic division are shown in Table 2.

TABLE 2.—COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL **RETAIL TRADE** ESTABLISHMENTS IN MARCH AND APRIL, 1929

| Geographic division [1] | Establishments | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| New England | 37 | 8,817 | 8,829 | +0.1 | $217,369 | $217,905 | +0.2 |
| Middle Atlantic | 278 | 36,849 | 36,714 | −0.4 | 915,108 | 906,106 | −1.0 |
| East North Central | 1,781 | 49,188 | 48,931 | −0.5 | 1,243,043 | 1,255,441 | +1.0 |
| West North Central | 467 | 10,457 | 10,208 | −2.4 | 228,626 | 218,931 | −4.2 |
| South Atlantic | 520 | 14,627 | 14,406 | −1.5 | 305,146 | 300,304 | −1.6 |
| East South Central | 343 | 5,241 | 4,919 | −6.1 | 104,756 | 97,017 | −7.4 |
| West South Central | 81 | 6,219 | 6,113 | −1.7 | 127,061 | 123,747 | −2.6 |
| Mountain | 54 | 2,026 | 1,922 | −5.1 | 39,123 | 36,935 | −5.6 |
| Pacific | 654 | 26,313 | 26,515 | +0.8 | 583,643 | 599,486 | +2.7 |
| **All divisions** | **4,215** | **159,737** | **158,557** | **−0.7** | **3,763,875** | **3,755,872** | **−0.2** |

[1] See footnotes 4 to 12, p. 198.

## 6. Employment in Hotels in April, 1929

EMPLOYMENT in hotels was 1.2 per cent lower in April, 1929, than in March, and pay-roll totals were 2.7 per cent lower, as shown by reports from 1,543 hotels having in April 139,080 employees and total pay rolls of $2,342,786.

The South Atlantic and Pacific divisions, which, since December, had shown increased employment each month, in April had fallen off as to employees 12.3 and 0.7 per cent, respectively, owing to the closing of winter resort hotels. New England, Middle Atlantic, and North Central hotels reported some increased employment, although the regular summer resort hotels had not yet opened for the season.

Per capita earnings, obtained by dividing the total number of employees into the total amount of pay roll, should not be interpreted as being the entire earnings of hotel employees. The pay-roll totals ere reported are cash payments only, with no regard to the value of board or room furnished employees, and of course no satisfactory estimate can be made of additional recompense in the way of tips. The additions to the money wages granted vary greatly, not only among localities but among hotels in one locality and among employees in one hotel. Some employees are furnished board and room, others are given board only for one, two, or three meals, while the division of tips is made in many ways.

Per capita earnings are further reduced by the considerable amount of part-time employment in hotels caused by conventions and banquets or other functions.

The details for each geographic division are shown in the table following:

COMPARISON OF EMPLOYMENT AND PAY-ROLL TOTALS IN IDENTICAL HOTELS IN MARCH AND APRIL, 1929

| Geographic division [1] | Hotels | Number on pay roll | | Per cent of change | Amount of pay roll (1 week) | | Per cent of change |
|---|---|---|---|---|---|---|---|
| | | March, 1929 | April, 1929 | | March, 1929 | April, 1929 | |
| New England | 99 | 7,803 | 7,882 | +1.0 | $131,711. | $132,282 | +0.4 |
| Middle Atlantic | 271 | 42,104 | 42,243 | +0.3 | 783,074 | 767,971 | −1.9 |
| East North Central | 266 | 26,831 | 27,345 | +1.9 | 471,963 | 475,554 | +0.8 |
| West North Central | 192 | 12,124 | 12,196 | +0.6 | 177,162 | 174,202 | −1.7 |
| South Atlantic | 192 | 17,945 | 15,742 | −12.3 | 270,977 | 241,314 | −10.9 |
| East South Central | 54 | 5,531 | 5,627 | +1.7 | 74,423 | 73,783 | −0.9 |
| West South Central | 97 | 8,215 | 7,936 | −3.4 | 111,703 | 108,456 | −2.9 |
| Mountain | 70 | 3,368 | 3,316 | −1.5 | 56,778 | 55,844 | −1.6 |
| Pacific | 302 | 16,904 | 16,793 | −0.7 | 330,575 | 322,380 | −2.5 |
| **All divisions** | **1,543** | **140,825** | **139,080** | **−1.2** | **2,408,366** | **2,342,786** | **−2.7** |

[1] See footnotes 4 to 12, p. 198.

## Employment on Class I Steam Railroads in the United States

THE monthly trend of employment from January, 1923, to March, 1929, on Class I railroads—that is, all roads having operating revenues of $1,000,000 or over—is shown by the index numbers published in Table 1. These index numbers are constructed from monthly reports of the Interstate Commerce Commission, using the monthly average for 1926 as 100.

TABLE 1.—INDEX OF EMPLOYMENT ON CLASS 1 STEAM RAILROADS IN THE UNITED STATES, JANUARY, 1923, TO MARCH, 1929

[Monthly average, 1926=100]

| Month | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
|---|---|---|---|---|---|---|---|
| January | 98.3 | 96.9 | 95.6 | 95.8 | 95.5 | 89.3 | 88.2 |
| February | 98.6 | 97.0 | 95.4 | 96.0 | 95.3 | 89.0 | 88.9 |
| March | 100.5 | 97.4 | 95.2 | 96.7 | 95.8 | 89.9 | 90.1 |
| April | 102.0 | 98.9 | 96.6 | 98.9 | 97.4 | 91.7 | |
| May | 105.0 | 99.2 | 97.8 | 100.2 | 99.4 | 94.5 | |
| June | 107.1 | 98.0 | 98.6 | 101.6 | 100.9 | 95.9 | |
| July | 108.2 | 98.1 | 99.4 | 102.9 | 101.0 | 95.6 | |
| August | 109.4 | 99.0 | 99.7 | 102.7 | 99.5 | 95.7 | |
| September | 107.8 | 99.7 | 99.9 | 102.8 | 99.1 | 95.3 | |
| October | 107.3 | 100.8 | 100.7 | 103.4 | 98.9 | 95.3 | |
| November | 105.2 | 99.0 | 99.1 | 101.2 | 95.7 | 92.9 | |
| December | 99.4 | 96.0 | 97.1 | 98.2 | 91.9 | 89.7 | |
| **Average** | **104.1** | **98.3** | **97.9** | **100.0** | **97.5** | **92.9** | [1] 89.1 |

[1] Average for 3 months.

Table 2 shows the total number of employees on the 15th day each of March, 1928, and February and March, 1929, and the pay-roll totals for the entire month of each month considered, by principal occupational groups and various important occupations.

In these tabulations data for the occupational group reported as "executives, officials, and staff assistants" are omitted.

TABLE 2.—EMPLOYMENT AND EARNINGS OF RAILROAD EMPLOYEES—MARCH, 1928, AND FEBRUARY AND MARCH, 1929

[From monthly reports of Interstate Commerce Commission. As data for only the more important occupations are shown separately, the group totals are not the sum of the items under the respective groups]

| Occupation | Number of employees at middle of month | | | Total earnings | | |
|---|---|---|---|---|---|---|
| | March, 1928 | February, 1929 | March, 1929 | March, 1928 | February, 1929 | March, 1929 |
| **Professional, clerical, and general** | **271,582** | **267,771** | **268,477** | **$39,602,717** | **$37,699,617** | **$39,342,731** |
| Clerks | 155,740 | 152,307 | 152,594 | 21,638,405 | 20,084,708 | 21,234,197 |
| Stenographers and typists | 24,741 | 24,663 | 24,659 | 3,225,227 | 3,110,677 | 3,221,819 |
| **Maintenance of way and structures** | **344,062** | **331,957** | **351,634** | **33,703,817** | **29,536,043** | **33,952,114** |
| Laborers, extra gang and work train | 44,272 | 36,910 | 43,316 | 3,401,504 | 2,431,711 | 3,320,509 |
| Laborers, track and roadway section | 176,687 | 173,578 | 184,531 | 13,441,003 | 11,457,324 | 13,626,471 |
| **Maintenance of equipment and stores** | **466,612** | **459,213** | **459,989** | **63,775,615** | **58,422,336** | **64,877,976** |
| Carmen | 99,905 | 99,268 | 99,545 | 15,492,172 | 14,221,518 | 16,066,720 |
| Machinists | 56,714 | 55,350 | 55,349 | 9,324,714 | 8,457,816 | 9,489,303 |
| Skilled trades helpers | 101,843 | 101,140 | 101,745 | 11,841,856 | 10,988,786 | 12,430,982 |
| Laborers (shops, engine houses, power plants and stores) | 39,151 | 38,206 | 38,172 | 3,803,607 | 3,445,020 | 3,730,662 |
| Common laborers (shops, engine houses, power plants, and stores) | 52,978 | 53,001 | 52,780 | 4,488,363 | 3,964,665 | 4,442,618 |
| **Transportation, other than train, engine, and yard** | **196,547** | **192,982** | **195,019** | **25,099,750** | **23,019,000** | **24,962,285** |
| Station agents | 29,978 | 29,446 | 29,419 | 4,828,576 | 4,438,704 | 4,731,117 |
| Telegraphers, telephoners, and towermen | 23,378 | 23,076 | 23,249 | 3,698,565 | 3,304,772 | 3,686,660 |
| Truckers (stations, warehouses, and platforms) | 34,343 | 33,056 | 34,386 | 3,387,217 | 2,930,011 | 3,389,768 |
| Crossing and bridge flagmen and gatemen | 21,347 | 20,642 | 20,648 | 1,646,054 | 1,577,479 | 1,593,214 |
| **Transportation (yard masters, switch tenders, and hostlers)** | **22,375** | **21,917** | **21,893** | **4,377,098** | **4,146,648** | **4,342,020** |
| **Transportation, train and engine** | **308,270** | **315,511** | **314,395** | **63,248,957** | **62,349,539** | **65,731,973** |
| Road conductors | 34,778 | 35,273 | 35,208 | 8,377,309 | 8,174,358 | 8,677,496 |
| Road brakemen and flagmen | 69,205 | 69,603 | 69,633 | 12,109,151 | 11,770,127 | 12,436,387 |
| Yard brakemen and yard helpers | 51,656 | 53,463 | 53,517 | 9,439,897 | 9,339,676 | 9,816,445 |
| Road engineers and motormen | 41,346 | 42,039 | 41,828 | 11,274,307 | 11,098,903 | 11,703,920 |
| Road firemen and helpers | 42,152 | 42,618 | 42,488 | 8,364,373 | 8,207,809 | 8,625,002 |
| **Total, all employees** | **1,609,448** | **1,589,351** | **1,611,407** | **229,807,954** | **215,173,183** | **233,209,099** |

## Changes in Employment and Pay Rolls in Various States

THE following data as to changes in employment and pay rolls have been compiled from reports received from the various State labor offices:

## PER CENT OF CHANGE IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES

*Monthly period*

| State, and industry group | Per cent of change, February to March, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **Illinois** | | |
| Stone, glass, and glass products | +2.0 | +1.6 |
| Metals, machinery, and conveyances | +3.7 | +3.1 |
| Wood products | +3.0 | +1.4 |
| Furs and leather goods | +1.4 | −7.1 |
| Chemicals, oils, paints, etc | +2.0 | −.6 |
| Printing and paper goods | −4.4 | −1.8 |
| Textiles | +1.8 | +10.0 |
| Clothing and millinery | −.3 | −1.9 |
| Food, beverages, and tobacco | −.8 | −3.6 |
| Miscellaneous | −5.2 | −2.4 |
| All manufacturing industries | +1.9 | +.9 |
| Trade, wholesale and retail | −2.1 | −.7 |
| Services | −.9 | −.9 |
| Public utilities | +.4 | −5.2 |
| Coal mining | −2.1 | −27.8 |
| Building and contracting | +3.2 | +3.0 |
| All industries | +1.1 | −1.9 |
| | March to April, 1929 | |
| **Iowa** | | |
| Food and kindred products | −1.7 | |
| Textiles | +11.2 | |
| Iron and steel works | +1.5 | |
| Lumber products | −.6 | |
| Leather products | −5.8 | |
| Paper products, printing and publishing | −1.6 | |
| Patent medicines, chemicals, and compounds | +2.9 | |
| Stone and clay products | +30.0 | |
| Tobacco and cigars | −3.6 | |
| Railway car shops | +2.5 | |
| Various industries | +1.1 | |
| All industries | +1.8 | |
| **Maryland** | | |
| Food products | −.5 | −1.1 |
| Textiles | −1.3 | −3.4 |
| Iron and steel and their products | +4.5 | +5.0 |
| Lumber and its products | −2.0 | −2.2 |
| Leather and its products | +.05 | +4.7 |
| Rubber tires | +2.3 | +14.5 |
| Paper and printing | +.9 | +.6 |
| Chemicals and allied products | +12.2 | +12.0 |
| Stone, clay, and glass products | +2.0 | +1.7 |
| Metal products, other than iron and steel | −1.2 | −.1 |
| Tobacco products | −9.5 | −15.8 |
| Machinery (not including transportation equipment) | −1.5 | −2.3 |
| Musical instruments | −1.0 | −11.6 |
| Transportation equipment | +10.8 | +2.3 |
| Car building and repairing | −.1 | +.3 |
| Miscellaneous | +1.3 | −1.1 |
| All manufacturing | +1.0 | +1.0 |
| Retail department stores | −2.6 | −3.2 |
| Wholesale establishments | +.2 | −.3 |
| Public utilities | +1.8 | +6.2 |
| Coal mines | −9.6 | −28.4 |
| Hotels | −2.9 | +4.0 |

| State, and industry group | Employment—index numbers (1919–1923=100) | |
|---|---|---|
| | February, 1929 | March, 1929 |
| **Massachusetts** | | |
| Boots and shoes | 71.8 | 70.4 |
| Bread and other bakery products | 107.2 | 106.7 |
| Cars and general shop construction and repairs, steam railroads | 70.0 | 69.3 |
| Clothing, men's and women's | 96.4 | 96.7 |
| Confectionery | 81.1 | 79.6 |
| Cotton goods | 58.6 | 59.5 |
| Dyeing and finishing textiles | 107.2 | 109.4 |
| Electrical machinery, apparatus, and supplies | 104.9 | 104.5 |
| Foundry and machine-shop products | 68.5 | 70.8 |
| Furniture | 105.8 | 107.9 |
| Hosiery and knit goods | 66.8 | 68.5 |
| Jewelry | 101.7 | 101.4 |
| Leather: Tanned, curried, and finished | 79.0 | 81.2 |
| Paper and wood pulp | 93.2 | 94.1 |
| Printing and publishing | 108.5 | 108.5 |
| Rubber footwear | 89.0 | 89.3 |
| Rubber goods, tires, and tubes | 83.3 | 84.9 |
| Silk goods | 101.3 | 101.2 |
| Textile machinery and parts | 54.0 | 55.7 |
| Woolen and worsted goods | 78.5 | 77.8 |
| All industries | 79.4 | 79.9 |

| | Per cent of change, February to March, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **New Jersey** | | |
| Food and kindred products | +3.0 | +4.4 |
| Textiles and their products | −1.2 | −1.9 |
| Iron and steel and their products | +3.5 | +4.7 |
| Lumber and its products | +1.6 | +3.0 |
| Leather and its products | −.7 | −2.0 |
| Tobacco products | +4.3 | +8.3 |
| Paper and printing | +.6 | +4.4 |
| Chemicals and allied products | +1.5 | −1.5 |
| Stone, clay, and glass products | +.4 | +2.2 |
| Metal products other than iron and steel | +1.9 | +2.1 |
| Vehicles for land transportation | −4.1 | −4.7 |
| Miscellaneous | +1.5 | +3.0 |
| All industries | +.9 | +1.2 |
| **New York** | | |
| Stone, clay, and glass | +2.9 | +3.7 |
| Metals and machinery | +2.0 | +3.2 |
| Wood manufactures | −1.6 | +2.2 |
| Furs, leather, and rubber goods | +1.4 | −.1 |
| Chemicals, oils, paints, etc | +.5 | +2.3 |
| Paper | −.5 | −2.3 |
| Printing and paper goods | +.1 | +3.4 |
| Textiles | +2.1 | +1.1 |
| Clothing and millinery | +5.4 | +7.7 |
| Food and tobacco | .0 | +.7 |
| Water, light, and power | .0 | +.4 |
| All industries | +1.8 | +3.0 |

PER CENT OF CHANGE IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES—Continued

*Monthly period*—Continued

| State, and industry group | Per cent of change, March to April, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **Oklahoma** | | |
| Cottonseed-oil mills | −50.5 | −36.4 |
| Food production: | | |
| Bakeries | −.0 | +3.3 |
| Confections | −6.9 | −11.7 |
| Creameries and dairies | +18.9 | +47.0 |
| Flour mills | −2.2 | +.1 |
| Ice and ice cream | +41.9 | +38.1 |
| Meat and poultry | −2.4 | +4.6 |
| Lead and zinc: | | |
| Mines and mills | +.1 | −5.8 |
| Smelters | +5.3 | +9.6 |
| Metals and machinery: | | |
| Auto repairs, etc | +.6 | −.5 |
| Machine shops and foundries | −1.7 | +4.7 |
| Tank construction and erection | −6.5 | +8.5 |
| Oil industry: | | |
| Production and gasoline manufacture | +26.9 | +19.8 |
| Refineries | +2.1 | −7.2 |
| Printing: Job work | −1.1 | +.8 |
| Public utilities: | | |
| Steam-railway shops | −4.9 | −3.5 |
| Street railways | −5.7 | −6.9 |
| Water, light, and power | +12.4 | +10.3 |
| Stone, clay, and glass: | | |
| Brick and tile | +19.1 | +11.1 |
| Cement and plaster | −7.0 | +3.2 |
| Crushed stone | +167.2 | +136.3 |
| Glass manufacture | +1.3 | +1.2 |
| Textiles and cleaning: | | |
| Textile manufacture | +3.6 | +2.1 |
| Laundries, etc | +2.8 | +1.1 |
| Woodworking: | | |
| Sawmills | +2.9 | +17.9 |
| Millwork, etc | +3.2 | −6.5 |
| All industries | +7.5 | +4.2 |

| State, and industry group | Employment—index numbers (1923–1925=100) | |
|---|---|---|
| | March, 1929 | April, 1929 |
| **Pennsylvania** | | |
| Metal products | 88.5 | 89.6 |
| Transportation equipment | 84.0 | [1] 89.0 |
| Textile products | 102.1 | 102.2 |
| Foods and tobacco | 94.6 | 94.2 |
| Stone, clay, and glass products | 80.9 | 81.6 |
| Lumber products | 73.4 | 68.5 |
| Chemical products | 98.0 | 99.8 |
| Leather and rubber products | 96.2 | 95.0 |
| Paper and printing | 91.0 | 88.5 |
| All industries | 91.8 | 92.8 |

| State, and industry group | Pay roll—index numbers (1923–1925=100) | |
|---|---|---|
| | March, 1929 | April, 1929 |
| **Pennsylvania**—Contd. | | |
| Metal products | 98.8 | 100.5 |
| Transportation equipment | 91.9 | [1] 97.2 |
| Textile products | 113.4 | 111.5 |
| Foods and tobacco | 95.6 | 94.2 |
| Stone, clay, and glass products | 79.3 | 82.6 |
| Lumber products | 73.3 | 69.0 |
| Chemical products | 106.3 | 107.1 |
| Leather and rubber products | 98.8 | 98.7 |
| Paper and printing | 107.7 | 104.3 |
| All industries | 99.8 | 100.9 |

| State, and industry group | Per cent of change, February to March, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **Wisconsin** | | |
| *Manual* | | |
| Logging | −9.7 | −10.8 |
| Mining | −2.7 | +.5 |
| Stone crushing and quarrying | +11.3 | +15.9 |
| Manufacturing: | | |
| Stone and allied industries | +5.0 | +11.4 |
| Metal | +3.0 | +.3 |
| Wood | +1.1 | +1.5 |
| Rubber | +.3 | −.7 |
| Leather | +3.1 | +3.7 |
| Paper | +.8 | −2.3 |
| Textiles | −2.1 | +9.4 |
| Foods | +1.5 | −.3 |
| Light and power | −4.2 | −7.7 |
| Printing and publishing | +.7 | +1.7 |
| Laundering, cleaning, and dyeing | −2.5 | +3.3 |
| Chemicals (including soap, glue, and explosives) | −.4 | +1.8 |
| All manufacturing | +1.4 | +.7 |
| Construction: | | |
| Building | +6.1 | +16.0 |
| Highway | +6.0 | +6.8 |
| Railroad | +1.9 | +2.0 |
| Marine dredging, sewer digging | +9.5 | −3.4 |
| Communication: | | |
| Steam railways | −6.8 | −5.6 |
| Electric railways | −5.2 | −1.5 |
| Express, telephone, and telegraph | −.7 | −4.0 |
| Wholesale trade | +13.8 | −5.5 |
| Hotels and restaurants | +2.6 | ---------- |
| *Nonmanual* | | |
| Manufacturing, mines, and quarries | +.1 | −.1 |
| Construction | −1.1 | −1.9 |
| Communication | +.4 | −4.2 |
| Wholesale trade | +1.4 | −8.9 |
| Retail trade—sales force only | +1.2 | −.2 |
| Miscellaneous professional services | −.3 | +13.4 |
| Hotels and restaurants | +.6 | ---------- |

[1] Preliminary figures.

PER CENT OF CHANGE IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES—Continued

*Yearly period*

| State, and industry group | Per cent of change, March, 1928, to March, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **California** | | |
| Stone, clay, and glass products | −5.8 | −5.5 |
| Metals, machinery, and conveyances | +22.5 | +23.7 |
| Wood manufactures | −5.2 | −7.6 |
| Leather and rubber goods | +18.3 | +17.8 |
| Chemicals, oils paints, etc | +27.7 | +33.7 |
| Printing and paper goods | +.7 | +2.8 |
| Textiles | +.8 | +5.1 |
| Clothing, millinery, and laundering | +.4 | +2.4 |
| Foods, beverages, and tobacco | −29.2 | −19.7 |
| Water, light, and power | −5.2 | −.5 |
| Miscellaneous | +6.5 | −5.4 |
| All industries | +1.8 | +7.6 |

| State, and industry group | Employment—index numbers (1922=100) | |
|---|---|---|
| | March, 1928 | March, 1929 |
| **Illinois** | | |
| Stone, clay, and glass products | 116.1 | 109.9 |
| Metals, machinery, and conveyances | 101.5 | 122.2 |
| Wood products | 81.0 | 76.5 |
| Furs and leather goods | 111.6 | 110.8 |
| Chemicals, oils, paints, etc | 116.7 | 127.0 |
| Printing and paper goods | 111.9 | 111.4 |
| Textiles | 108.6 | 97.1 |
| Clothing and millinery | 66.4 | 62.5 |
| Foods, beverages, and tobacco | 91.1 | 88.0 |
| All manufacturing industries | 92.4 | 100.3 |
| Trade, wholesale and retail | 69.5 | 67.5 |
| Public utilities | 134.1 | 139.9 |
| Coal mining | 74.8 | 60.9 |
| Building and contracting | 89.7 | 94.7 |
| All industries | 98.4 | 104.2 |

| State, and industry group | Employment—index numbers (1919–1923=100) | |
|---|---|---|
| | March, 1928 | March, 1929 |
| **Massachusetts** | | |
| Boots and shoes | 74.0 | 70.4 |
| Bread and other bakery products | 101.5 | 106.7 |
| Cars and general shop construction and repairs, steam railroads | 74.6 | 69.3 |
| Clothing, men's and women's | 95.0 | 96.7 |
| Confectionery | 79.5 | 79.6 |
| Cotton goods | 65.8 | 59.5 |
| Dyeing and finishing textiles | 101.9 | 109.4 |
| Electric machinery, apparatus, and supplies | 101.2 | 104.5 |
| Foundry and machine-shop products | 64.6 | 70.8 |
| Furniture | 106.1 | 107.9 |
| Hosiery and knit goods | 88.1 | 68.5 |
| Jewelry | 100.4 | 101.4 |
| Leather: Tanned, curried, and finished | 89.7 | 81.2 |
| Paper and wood pulp | 93.4 | 94.1 |
| Printing and publishing | 104.6 | 108.5 |
| Rubber footwear | 88.9 | 89.3 |
| Rubber goods, tires and tubes | 91.4 | 84.9 |
| Silk goods | 114.2 | 101.2 |
| Textile machinery and parts | 57.6 | 55.7 |
| Woolen and worsted goods | 82.1 | 77.8 |
| All industries | 82.1 | 79.9 |

| State, and industry group | Per cent of change, March, 1928, to March, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **New York** | | |
| Stone, clay, and glass | +1.9 | +5.0 |
| Metals and machinery | +14.3 | +17.8 |
| Wood manufactures | −5.1 | −2.2 |
| Furs, leather, and rubber goods | +3.8 | −1.6 |
| Chemicals, oils, paints, etc | +1.0 | +2.6 |
| Paper | +4.1 | +6.4 |
| Printing and paper goods | +.6 | +5.0 |
| Textiles | +1.6 | +.8 |
| Clothing and millinery | +2.3 | +7.3 |
| Food and tobacco | +.3 | −.9 |
| Water, light, and power | −4.6 | −5.6 |
| All industries | +5.8 | +8.3 |

PER CENT OF CHANGE IN EMPLOYMENT AND PAY ROLLS IN SPECIFIED STATES—Continued

*Yearly period*—Continued

| State, and industry group | Per cent of change, April, 1928, to April, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **Oklahoma** | | |
| Cottonseed-oil mills | −9.5 | −6.2 |
| Food production: | | |
| Bakeries | +2.1 | +1.6 |
| Confections | .0 | +15.4 |
| Creameries and dairies | −10.7 | −.7 |
| Flour mills | +11.2 | +6.3 |
| Ice and ice cream | +238.4 | +247.1 |
| Meat and poultry | −8.5 | −1.7 |
| Lead and zinc: | | |
| Mines and mills | +88.9 | +92.0 |
| Smelters | +10.6 | +6.8 |
| Metals and machinery: | | |
| Auto repairs, etc | +302.2 | +290.2 |
| Machine shops and foundries | +36.3 | +51.6 |
| Tank construction and erection | +.7 | +38.3 |
| Oil industry: | | |
| Producing and gasoline manufacture | +3.6 | −8.2 |
| Refineries | +21.3 | +7.6 |
| Printing: Job work | +8.1 | +19.8 |
| Public utilities: | | |
| Steam railway shops | +2.6 | +3.4 |
| Street railways | +23.2 | +19.3 |
| Water, light, and power | +269.0 | +245.1 |
| Stone, clay, and glass: | | |
| Brick and tile | +64.3 | +46.8 |
| Cement and plaster | +7.3 | +11.7 |
| Crushed stone | +285.2 | +264.6 |
| Glass manufacture | −3.4 | −3.3 |
| Textiles and cleaning: | | |
| Textile manufacture | +20.5 | −10.2 |
| Laundries, etc | +11.4 | +10.3 |
| Woodworking: | | |
| Sawmills | +26.0 | +23.0 |
| Millwork, etc | +1.6 | −7.8 |
| All industries | +34.1 | +29.4 |

| State, and industry group | Employment—index numbers (1923–1925=100) | |
|---|---|---|
| | April, 1928 | April, 1929 |
| **Pennsylvania** | | |
| Metal products | 81.0 | 89.6 |
| Transportation equipment | 75.3 | [1] 89.0 |
| Textile products | 94.8 | 102.2 |
| Foods and tobacco | 91.9 | 94.2 |
| Stone, clay, and glass products | 82.7 | 81.6 |
| Lumber products | 70.6 | 68.5 |
| Chemical products | 95.5 | 99.8 |
| Leather and rubber products | 99.8 | 95.0 |
| Paper and printing | 92.8 | 88.5 |
| All industries | 85.1 | 92.8 |

| State, and industry group | Poy roll—index numbers (1923–1925=100) | |
|---|---|---|
| | April, 1928 | April, 1929 |
| **Pennsylvania**—Continued | | |
| Metal products | 81.6 | 100.5 |
| Transportation equipment | 67.9 | [1] 97.2 |
| Textile products | 94.4 | 111.5 |
| Foods and tobacco | 86.3 | 94.2 |
| Stone, clay, and glass products | 75.5 | 82.6 |
| Lumber products | 66.0 | 69.0 |
| Chemical products | 105.5 | 107.1 |
| Leather and rubber products | 101.4 | 98.7 |
| Paper and printing | 105.2 | 104.3 |
| All industries | 82.8 | 100.9 |

| State, and industry group | Per cent of change, March, 1928, to March, 1929 | |
|---|---|---|
| | Employment | Pay roll |
| **Wisconsin** | | |
| *Manual* | | |
| Logging | −14.1 | −16.8 |
| Mining | −17.2 | −9.4 |
| Stone crushing and quarrying | −38.2 | −31.2 |
| Manufacturing: | | |
| Stone and allied industries | −36.9 | −33.4 |
| Metal | +13.7 | +16.3 |
| Wood | +5.3 | +.6 |
| Rubber | +9.7 | +11.6 |
| Leather | +7.0 | +5.4 |
| Paper | −1.1 | +2.3 |
| Textiles | −11.1 | +3.6 |
| Foods | +2.5 | +4.6 |
| Light and power | +13.2 | +10.3 |
| Printing and publishing | +7.5 | +9.4 |
| Laundering, cleaning, and dyeing | +3.3 | +6.1 |
| Chemical (including soap, glue, and explosives) | −14.9 | −15.5 |
| All manufacturing | +6.4 | +3.8 |
| Construction: | | |
| Building | +30.6 | +19.4 |
| Highway | +56.7 | +32.9 |
| Railroad | −1.5 | +1.2 |
| Marine dredging, sewer digging | −1.2 | −30.5 |
| Communication: | | |
| Steam railways | +2.5 | +12.0 |
| Electric railways | −9.7 | −4.4 |
| Express, telephone, and telegraph | −4.9 | +2.1 |
| Wholesale trade | +6.1 | +6.6 |
| Hotels and restaurants | +6.6 | ---------- |
| *Nonmanual* | | |
| Manufacturing, mines, and quarries | +3.5 | +3.9 |
| Construction | −2.1 | −5.3 |
| Communication | +15.3 | +10.2 |
| Wholesale trade | +4.1 | −2.7 |
| Retail trade, sales force only | +.9 | +5.7 |
| Miscellaneous professional services | +5.6 | +6.1 |
| Hotels and restaurants | −13.6 | ---------- |

[1] Preliminary figures.

# UNEMPLOYMENT CONDITIONS AND RELIEF

## Stability of Employment in the Cotton Industry and the Fertilizer Industry

THESE studies have been made for the purpose of measuring the degree of regularity of employment and to ascertain whether employment has improved during recent years. The plan of analysis is the same as that employed in similar studies of various industries previously published in the Labor Review, as follows: Railroad industry, August, 1928; iron and steel industry, November, 1928; men's clothing industry, January, 1929; automobile industry, February, 1929; leather industry and boot and shoe industry, March, 1929; paper and pulp industry, and slaughtering and meat-packing industry, April, 1929; silk industry, May, 1929.

The basic data for the study are derived from monthly reports made to the Bureau of Labor Statistics by most of the important manufacturing plants, as part of the general employment survey made by the bureau. As these reports give only the number of employees of all kinds without separation by occupational groups, the present analysis must disregard occupational differences and treat the employees of a plant as a unit.

The method here employed for the measurement of stability is that of the relationship of average monthly employment during the year to the number of employees in the month of maximum employment. Thus, if during 1928 a particular plant had a monthly average of 90 employees and the maximum number in any month was 100, then the stability of employment may be fairly said to be 90 per cent. In other words, if the 100 men needed to fill the positions at the busiest season had no other opportunity for work, then each man would have an opportunity of 90 per cent of full-time employment. Of course, this is rarely quite true, but it is often substantially true; and, in any case, the method offers a fairly accurate measure of the degree in which a particular establishment has attained a condition of stable employment. On the other hand, failure of an establishment to obtain a good level of stability in one occupation or in all occupations must not necessarily be attributed to faulty management. Many factors over which the management has little or no control may affect the stability of employment. Nevertheless, an employment stability of or very near to 100 per cent is the desirable goal.

### Cotton Industry

THE percentages of full-time employment (computed as described above) are presented for each of the years 1923 to 1928 for 82 cotton mills engaged in the spinning and weaving of cotton. These 82 mills are divided as to northern mills and southern mills, depending upon their location.

The southern group shows a better stability rate than the northern group. The southern group also shows a decided increase in employment stability during the past few years, while the northern group shows a declining stability rate.

In 1928 over 80 per cent of the mills in the southern district and less than 50 per cent in the northern district had a stability rate of over 90 per cent. Further, only slightly over 2 per cent of the mills in the southern district had a stability rate of less than 80 per cent, while in the northern district 20 per cent of the mills studied had a rate of less than 80 per cent.

However, in both districts there were some individual mills which maintained a good average of employment during the six years studied, such as Nos. 2, 5, 11, and 15 in the northern district and 2, 4, 10, 13, 16, and 20 in the southern district.

The establishments are arranged in the table in descending order according to the favorableness of their showing in 1928.

TABLE 1.—PER CENT OF FULL-TIME EMPLOYMENT IN THE COTTON INDUSTRY

| Plant No. | State | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 |
|---|---|---|---|---|---|---|---|
| | *Southern group* | | | | | | |
| 1 | South Carolina | 97.8 | 84.5 | 90.0 | 100.0 | 100.0 | 100.0 |
| 2 | Virginia | 98.2 | 92.7 | 94.4 | 97.1 | 97.5 | 98.4 |
| 3 | North Carolina | 74.7 | 96.1 | 96.4 | 95.5 | 94.4 | 98.1 |
| 4 | Virginia | 98.3 | 96.5 | 96.5 | 93.5 | 98.7 | 98.0 |
| 5 | North Carolina | 99.2 | 99.4 | 99.2 | 98.9 | 83.1 | 97.8 |
| 6 | do | 99.6 | 94.1 | 80.9 | 86.1 | 88.8 | 97.5 |
| 7 | Alabama | 76.2 | 93.0 | 96.6 | 93.4 | 96.4 | 97.4 |
| 8 | Texas | 87.3 | 89.4 | 92.2 | 95.4 | 94.2 | 97.4 |
| 9 | North Carolina | 90.2 | 96.2 | 88.5 | 96.5 | 96.2 | 97.3 |
| 10 | do | 96.1 | 94.3 | 95.5 | 94.7 | 98.2 | 97.2 |
| 11 | Texas | 92.3 | 95.1 | 94.6 | 95.5 | 97.2 | 97.1 |
| 12 | Alabama | 91.2 | 95.1 | 94.2 | 91.0 | 96.4 | 97.0 |
| 13 | South Carolina | 97.9 | 95.7 | 94.4 | 93.6 | 93.3 | 96.8 |
| 14 | do | 95.4 | 87.8 | 93.3 | 97.4 | 76.1 | 96.6 |
| 15 | Louisiana | 94.6 | 91.8 | 95.7 | 95.2 | 94.7 | 96.5 |
| 16 | South Carolina | 96.0 | 95.4 | 93.3 | 92.3 | 96.6 | 96.4 |
| 17 | do | 86.8 | 86.6 | 85.3 | 89.9 | 93.6 | 96.3 |
| 18 | Louisiana | 94.0 | 93.3 | 95.4 | 95.0 | 90.3 | 96.3 |
| 19 | South Carolina | 94.9 | 93.3 | 96.5 | 74.0 | 97.6 | 96.2 |
| 20 | Alabama | 95.6 | 97.4 | 95.1 | 93.1 | 98.0 | 95.8 |
| 21 | South Carolina | 67.9 | 48.3 | 78.6 | 86.7 | 90.6 | 95.8 |
| 22 | Alabama | 90.6 | 83.9 | 87.1 | 92.5 | 94.8 | 95.4 |
| 23 | Georgia | 93.1 | 67.0 | 63.3 | 80.8 | 93.9 | 95.3 |
| 24 | do | 85.0 | 69.8 | 82.6 | 94.8 | 93.6 | 95.0 |
| 25 | South Carolina | 91.0 | 72.2 | 96.8 | 89.8 | 96.5 | 94.7 |
| 26 | North Carolina | 98.3 | 92.2 | 67.5 | 97.0 | 96.5 | 94.2 |
| 27 | Georgia | 96.6 | 94.2 | 92.4 | 90.5 | 90.7 | 94.2 |
| 28 | do | 95.3 | 96.0 | 95.6 | 92.9 | 96.5 | 93.9 |
| 29 | do | 85.9 | 77.8 | 89.3 | 92.7 | 97.5 | 93.5 |
| 30 | North Carolina | 98.0 | 95.4 | 95.1 | 95.4 | 94.2 | 93.5 |
| 31 | do | 98.6 | 93.4 | 93.7 | 92.5 | 94.7 | 93.2 |
| 32 | Texas | 91.9 | 93.0 | 94.2 | 93.7 | 96.5 | 92.6 |
| 33 | Georgia | 95.7 | 94.4 | 94.1 | 97.6 | 77.2 | 92.2 |
| 34 | North Carolina | 92.3 | 79.6 | 93.2 | 91.3 | 85.4 | 91.1 |
| 35 | do | 100.0 | 33.5 | 89.8 | 90.8 | 94.7 | 90.6 |
| 36 | do | 93.4 | 91.8 | 93.7 | 79.5 | 94.6 | 90.4 |
| 37 | South Carolina | 96.4 | 95.6 | 95.2 | 83.3 | 96.3 | 90.1 |
| 38 | North Carolina | 86.6 | 97.0 | 85.2 | 70.7 | 90.8 | 89.4 |
| 39 | South Carolina | 96.7 | 51.7 | 81.9 | 88.8 | 95.2 | 89.2 |
| 40 | Virginia | 94.1 | 93.6 | 80.2 | 96.9 | 96.0 | 88.8 |
| 41 | do | 67.3 | 83.2 | 96.7 | 92.5 | 91.5 | 88.4 |
| 42 | Georgia | 90.4 | 71.8 | 88.4 | 93.3 | 92.8 | 87.8 |
| 43 | North Carolina | 92.3 | 85.2 | 80.0 | 85.1 | 96.7 | 85.5 |
| 44 | do | 96.9 | 92.1 | 93.6 | 93.7 | 94.8 | 83.7 |
| 45 | Georgia | 71.2 | 60.8 | 69.7 | 66.0 | 93.5 | 81.9 |
| 46 | do | 95.7 | 94.6 | 92.5 | 94.0 | 94.1 | 80.0 |
| 47 | South Carolina | 74.9 | 74.3 | 95.0 | 83.4 | 91.7 | 65.2 |
| | Average | 91.3 | 86.2 | 90.1 | 90.9 | 93.7 | 93.0 |
| | Highest | 100.0 | 99.4 | 99.2 | 100.0 | 100.0 | 100.0 |
| | Lowest | 67.3 | 33.5 | 63.3 | 66.0 | 76.1 | 65.2 |

TABLE 1.—PER CENT OF FULL-TIME EMPLOYMENT IN THE COTTON INDUSTRY—Continued

| Plant No. | State | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 |
|---|---|---|---|---|---|---|---|
| | *Southern group*—Continued | | | | | | |
| | Per cent of plants with employment stability of— | | | | | | |
| | 95 per cent and over | 44.7 | 27.7 | 31.9 | 29.8 | 42.6 | 46.8 |
| | 90 to 94.9 per cent | 31.9 | 34.0 | 34.0 | 42.6 | 46.8 | 36.2 |
| | 85 to 89.9 per cent | 10.6 | 8.5 | 14.9 | 12.8 | 4.3 | 12.8 |
| | 80 to 84.9 per cent | | 6.4 | 10.6 | 6.4 | 2.1 | 2.1 |
| | Under 80 per cent | 12.8 | 23.4 | 8.5 | 8.5 | 4.3 | 2.1 |
| | *Northern group* | | | | | | |
| 1 | Maine | 99.2 | 88.2 | 97.8 | 95.4 | 96.8 | 98.5 |
| 2 | Massachusetts | 96.1 | 95.1 | 96.5 | 98.4 | 99.2 | 98.1 |
| 3 | New York | 73.3 | 48.3 | 83.2 | 89.8 | 95.5 | 97.8 |
| 4 | Massachusetts | 93.4 | 82.8 | 89.5 | 91.4 | 90.0 | 97.7 |
| 5 | do | 95.8 | 98.4 | 98.1 | 90.3 | 94.3 | 97.5 |
| 6 | Connecticut | 98.9 | 79.2 | 98.5 | 83.2 | 96.6 | 96.3 |
| 7 | Pennsylvania | 90.2 | 72.6 | 94.7 | 96.4 | 94.7 | 94.5 |
| 8 | Connecticut | 91.7 | 94.9 | 98.2 | 85.9 | 90.2 | 94.5 |
| 9 | Rhode Island | 97.3 | 95.9 | 92.0 | 83.7 | 93.2 | 94.5 |
| 10 | Maine | 95.7 | 91.1 | 91.1 | 90.8 | 91.5 | 94.2 |
| 11 | Massachusetts | 95.6 | 99.1 | 97.2 | 92.4 | 98.1 | 94.2 |
| 12 | Connecticut | 98.0 | 83.1 | 98.2 | 90.5 | 89.8 | 93.6 |
| 13 | Massachusetts | 93.6 | 92.2 | 90.8 | 96.6 | 94.9 | 92.4 |
| 14 | New Hampshire | 74.8 | 67.7 | 84.5 | 92.2 | 95.4 | 90.7 |
| 15 | do | 97.9 | 96.6 | 97.5 | 96.0 | 93.6 | 90.6 |
| 16 | Maine | 94.7 | 82.7 | 97.0 | 89.9 | 89.6 | 90.1 |
| 17 | Massachusetts | 93.7 | 52.5 | 75.1 | 97.7 | 87.4 | 87.8 |
| 18 | Rhode Island | 98.6 | 45.9 | 87.8 | 87.2 | 97.0 | 87.3 |
| 19 | New Hampshire | 79.4 | 60.3 | 72.4 | 83.1 | 89.4 | 87.3 |
| 20 | Massachusetts | 97.3 | 91.0 | 91.2 | 79.2 | 93.0 | 85.4 |
| 21 | do | 94.2 | 64.4 | 86.2 | 88.2 | 96.6 | 85.2 |
| 22 | Rhode Island | 95.5 | 92.7 | 92.7 | 93.4 | 95.5 | 84.9 |
| 23 | New York | 96.3 | 91.6 | 97.5 | 91.6 | 93.8 | 84.7 |
| 24 | Massachusetts | 88.2 | 81.2 | 93.2 | 73.0 | 92.6 | 84.7 |
| 25 | do | 83.1 | 74.9 | 66.4 | 85.7 | 89.1 | 83.7 |
| 26 | Connecticut | 98.6 | 91.1 | 97.7 | 93.2 | 97.3 | 83.4 |
| 27 | Maine | 94.9 | 89.4 | 78.8 | 77.4 | 91.7 | 81.1 |
| 28 | Rhode Island | 95.3 | 88.0 | 95.9 | 88.3 | 90.9 | 80.7 |
| 29 | Massachusetts | 95.4 | 66.4 | 81.7 | 87.3 | 91.9 | 79.0 |
| 30 | do | 98.6 | 44.0 | 88.6 | 90.7 | 91.7 | 74.7 |
| 31 | Rhode Island | 84.4 | 39.4 | 76.9 | 86.2 | 79.4 | 71.9 |
| 32 | Massachusetts | 93.7 | 84.3 | 91.8 | 90.8 | 89.5 | 70.3 |
| 33 | Maine | 96.5 | 73.3 | 94.1 | 86.5 | 90.0 | 63.0 |
| 34 | Pennsylvania | 81.3 | 79.2 | 85.6 | 89.1 | 96.6 | 51.6 |
| 35 | Massachusetts | 90.5 | 22.1 | 33.6 | 95.1 | 98.6 | 38.8 |
| | Average | 92.6 | 77.1 | 88.3 | 89.3 | 93.0 | 85.2 |
| | Highest | 99.2 | 99.1 | 98.5 | 98.4 | 98.6 | 98.5 |
| | Lowest | 73.3 | 22.1 | 33.6 | 73.0 | 79.4 | 38.8 |
| | Per cent of plants with employment stability of— | | | | | | |
| | 95 per cent and over | 51.4 | 14.3 | 34.3 | 20.0 | 34.3 | 17.1 |
| | 90 to 94.9 per cent | 28.6 | 20.0 | 25.7 | 31.4 | 45.7 | 28.6 |
| | 85 to 89.9 per cent | 2.9 | 8.6 | 14.3 | 31.4 | 17.1 | 14.3 |
| | 80 to 84.9 per cent | 8.6 | 14.3 | 8.6 | 8.6 | | 20.0 |
| | Under 80 per cent | 8.6 | 42.9 | 17.1 | 8.6 | 2.9 | 20.0 |
| | *Northern and southern groups combined* | | | | | | |
| | Average | 91.9 | 82.3 | 89.3 | 90.3 | 93.4 | 89.6 |
| | Highest | 100.0 | 99.4 | 99.2 | 100.0 | 100.0 | 100.0 |
| | Lowest | 67.3 | 22.1 | 33.6 | 66.0 | 76.1 | 38.8 |
| | Per cent of plants with employment stability of— | | | | | | |
| | 95 per cent and over | 47.6 | 22.0 | 32.9 | 25.6 | 39.0 | 34.1 |
| | 90 to 94.9 per cent | 30.5 | 28.0 | 30.5 | 37.8 | 46.3 | 32.9 |
| | 85 to 89.9 per cent | 7.3 | 8.5 | 14.6 | 20.7 | 9.8 | 13.4 |
| | 80 to 84.9 per cent | 3.7 | 10.0 | 10.0 | 7.3 | 1.2 | 9.8 |
| | Under 80 per cent | 11.0 | 31.7 | 12.2 | 8.5 | 3.7 | 9.8 |

## Fertilizer Industry

THE percentages of full-time employment (computed as described) are presented for each of the years 1923 to 1928 for 53 plants manufacturing commercial fertilizer.

The establishments are arranged in the table in descending order according to the favorableness of their showing in 1928.

The study discloses that the fertilizer industry has a very unstable condition of employment and that no appreciable betterment of condition is apparent. The average rate of stability for the industry as a whole in 1928 was only 51.1. The table also discloses that of the 53 plants covered only about 4 per cent had a rate as high as 90, while 88 per cent of the plants had a rate of less than 80 and running as low as 26.1.

The regular force of the individual plants is greatly augmented by additional employees during the shipping season for only a few months during the year and these additional employees are dropped when it is over. The low rate of stability of employment is largely occasioned by this seasonal activity of this industry.

TABLE 2.—PER CENT OF FULL-TIME EMPLOYMENT IN THE FERTILIZER INDUSTRY

| Plant No. | State | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 |
|---|---|---|---|---|---|---|---|
| 1 | Ohio | 80.2 | 86.4 | 92.9 | 93.5 | 93.6 | 96.2 |
| 2 | do | 88.4 | 90.0 | 81.8 | 86.1 | 82.6 | 90.9 |
| 3 | Michigan | 79.9 | 79.9 | 66.7 | 66.6 | 73.0 | 87.5 |
| 4 | Iowa | 93.8 | 90.0 | 90.9 | 90.5 | 90.9 | 87.0 |
| 5 | Texas | 71.4 | 64.7 | 91.3 | 92.5 | 51.4 | 85.8 |
| 6 | New Jersey | 83.1 | 75.3 | 55.9 | 81.8 | 84.1 | 85.5 |
| 7 | Florida | 77.0 | 80.0 | 83.7 | 73.4 | 74.8 | 75.9 |
| 8 | Tennessee | 71.1 | 22.5 | 40.8 | 54.4 | 51.6 | 73.0 |
| 9 | Ohio | 48.0 | 50.8 | 51.8 | 56.4 | 59.0 | 70.4 |
| 10 | Pennsylvania | 86.7 | 85.3 | 85.3 | 71.1 | 70.7 | 70.2 |
| 11 | do | 82.4 | 70.7 | 65.7 | 67.4 | 82.5 | 65.3 |
| 12 | Florida | 85.9 | 76.3 | 77.3 | 78.5 | 71.3 | 65.0 |
| 13 | Massachusetts | 59.5 | 67.0 | 54.3 | 64.5 | 71.4 | 65.0 |
| 14 | Pennsylvania | 57.8 | 60.6 | 60.9 | 61.9 | 67.7 | 63.1 |
| 15 | Maryland | 57.5 | 59.9 | 57.5 | 62.7 | 54.4 | 63.1 |
| 16 | Alabama | 51.6 | 46.7 | 51.1 | 54.3 | 50.0 | 62.9 |
| 17 | Ohio | 50.0 | 25.6 | 28.6 | 38.5 | 33.9 | 60.4 |
| 18 | do | 48.6 | 63.0 | 47.7 | 51.2 | 55.8 | 58.0 |
| 19 | Connecticut | 60.0 | 59.6 | 46.4 | 60.9 | 43.7 | 54.2 |
| 20 | Mississippi | 65.9 | 50.0 | 41.7 | 54.4 | 59.6 | 53.9 |
| 21 | North Carolina | 81.2 | 35.4 | 53.3 | 50.8 | 34.0 | 53.2 |
| 22 | Connecticut | 56.1 | 63.2 | 51.2 | 52.3 | 57.6 | 52.4 |
| 23 | Pennsylvania | 54.1 | 54.8 | 54.9 | 52.5 | 48.3 | 52.3 |
| 24 | Virginia | 38.6 | 52.4 | 58.0 | 42.0 | 47.4 | 50.9 |
| 25 | North Carolina | 54.3 | 60.4 | 69.2 | 50.0 | 45.8 | 50.0 |
| 26 | Virginia | 72.7 | 47.7 | 34.0 | 49.8 | 54.0 | 48.1 |
| 27 | Mississippi | 52.0 | 56.1 | 56.3 | 56.1 | 65.3 | 45.4 |
| 28 | Virginia | 51.3 | 48.1 | 41.5 | 40.6 | 36.1 | 43.3 |
| 29 | Ohio | 28.1 | 33.3 | 43.9 | 38.8 | 38.9 | 42.6 |
| 30 | Mississippi | 37.2 | 38.8 | 40.3 | 39.5 | 45.6 | 41.5 |
| 31 | South Carolina | 40.7 | 54.1 | 60.0 | 40.3 | 58.7 | 40.2 |
| 32 | Virginia | 43.8 | 37.6 | 34.0 | 36.7 | 36.1 | 39.7 |
| 33 | North Carolina | 53.3 | 48.4 | 63.3 | 44.4 | 62.1 | 39.6 |
| 34 | Indiana | 56.8 | 47.7 | 36.4 | 36.2 | 40.0 | 39.2 |
| 35 | Ohio | 57.1 | 68.2 | 90.9 | 68.2 | 36.8 | 38.5 |
| 36 | Virginia | 55.6 | 46.8 | 36.6 | 41.8 | 34.3 | 37.9 |
| 37 | South Carolina | 39.4 | 48.7 | 47.4 | 44.6 | 38.4 | 37.2 |
| 38 | Indiana | 74.7 | 57.6 | 45.8 | 33.1 | 34.3 | 36.8 |
| 39 | Georgia | 33.3 | 33.9 | 64.3 | 38.8 | 38.7 | 37.5 |
| 40 | North Carolina | 44.9 | 35.7 | 32.8 | 41.7 | 34.3 | 36.7 |
| 41 | Georgia | 46.4 | 59.1 | 54.3 | 47.8 | 48.8 | 35.5 |
| 42 | Arkansas | 50.0 | 40.0 | 45.8 | 50.4 | 44.2 | 34.0 |
| 43 | South Carolina | 49.0 | 43.5 | 43.8 | 46.7 | 53.1 | 33.3 |
| 44 | Virginia | 52.6 | 43.8 | 43.3 | 43.3 | 35.3 | 33.1 |
| 45 | Alabama | 43.3 | 41.2 | 33.8 | 40.2 | 31.8 | 33.1 |
| 46 | South Carolina | 36.7 | 32.0 | 42.7 | 30.5 | 30.7 | 32.9 |
| 47 | Indiana | 50.0 | 84.1 | 54.8 | 36.3 | 50.7 | 32.8 |

TABLE 2.—PER CENT OF FULL-TIME EMPLOYMENT IN THE FERTILIZER INDUSTRY—Continued

| Plant No. | State | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 |
|---|---|---|---|---|---|---|---|
| 48 | Georgia | 47.7 | 37.8 | 34.5 | 40.0 | 24.6 | 32.3 |
| 49 | do | 58.9 | 40.5 | 37.9 | 40.7 | 26.3 | 32.1 |
| 50 | do | 41.8 | 39.2 | 32.1 | 32.0 | 25.8 | 29.8 |
| 51 | do | 44.2 | 43.9 | 57.6 | 48.6 | 27.8 | 29.5 |
| 52 | do | 45.1 | 32.6 | 44.7 | 73.8 | 38.2 | 27.9 |
| 53 | North Carolina | 39.3 | 43.8 | 45.4 | 40.0 | 28.3 | 26.1 |
| | Average | 57.2 | 53.9 | 53.9 | 53.4 | 50.5 | 51.1 |
| | Highest | 93.8 | 90.0 | 92.9 | 93.5 | 93.6 | 96.2 |
| | Lowest | 28.1 | 22.5 | 28.6 | 30.5 | 24.6 | 26.1 |
| | Per cent of plants with employment stability of— | | | | | | |
| | 95 per cent and over | | | | | | 1.9 |
| | 90 to 94.9 per cent | 1.9 | 3.8 | 7.5 | 5.7 | 3.8 | 1.9 |
| | 85 to 89.9 per cent | 5.7 | 3.8 | 1.9 | 1.9 | | 7.5 |
| | 80 to 84.9 per cent | 7.5 | 3.8 | 3.8 | 1.9 | 5.7 | |
| | Under 80 per cent | 84.9 | 88.7 | 86.8 | 90.6 | 90.6 | 88.7 |

## Labor-Absorbing Power of American Industry

A SURVEY of the extent to which dispossessed workers were being absorbed by industry was made in the summer of 1928 by the Institute of Economics of the Brookings Institution, Washington, as part of an inquiry pertaining to unemployment, requested by the Senate Committee on Education and Labor. The results of the survey were presented in a paper[1] before the annual meeting of the American Statistical Association at Chicago in December, 1928, the proceedings of which have been published in a supplement to the March, 1929, Journal of the association.

The information presented was secured by trained investigators, who interviewed 754 discharged workers in a variety of industries in three industrial centers. The names and addresses of the workers discharged within the 12 months preceding September, 1928, were secured from the pay rolls of the discharging companies. Only those employees who were discharged because their services were no longer needed were included in the survey, no account being taken of those dismissed for inefficiency or insubordination.

The information obtained included the sex and age of the worker, the date of discharge from last steady job, whether permanent employment had been obtained, the date and place of new employment, nature of the industry, type of work being done, and whether the worker had had any jobs in the interval between discharge from the plant at which the investigator secured the original information and the finding of a new job. An attempt was also made to find out how the pay received by the worker on the new job compared with that received on the old one.

Only 410 of the 754 workers interviewed had found permanent employment up to the time of the survey. Of these, 6 had been idle for a year or more; 228, or over 50 per cent, had been out of work for more than a quarter of the year; and only 47, or less than 12 per cent, had secured permanent work within a month of discharge.

[1] Measuring the Labor Absorbing Power of American Industry, by Isador Lubin.

Of the 344 persons still without permanent jobs—45.6 per cent of the workers studied—29, or 8.4 per cent, had been out of work for a year. Only 202, or 58.7 per cent, had been idle for less than one-half of the year.

Thus, the larger proportion of the workers had found considerable difficulty in getting relocated, and those who did find work had been idle for some time.

Temporary employment had been obtained by 234 workers, or approximately one-third of the total number surveyed. Of these, 132 (17.5 per cent of the total number surveyed) had steady jobs when interviewed, while 102 (13.5 per cent of the total) were still only temporarily employed. Of the 520 (69 per cent of the total) who did not secure temporary employment, 278 (36.9 per cent of the total) had steady jobs when interviewed, but 242 (32.1 per cent of the total) were without employment. The temporary work included road building, distributing circulars, selling newspapers, clerking in stores on Saturdays, and mowing of lawns.

The following table shows the period of unemployment of the 754 discharged workers interviewed:

PERIOD OF UNEMPLOYMENT OF 754 DISCHARGED WORKERS

| Length of time unemployed | Discharged workers who found work | | | | Discharged workers still unemployed | | | |
|---|---|---|---|---|---|---|---|---|
| | Number | Per cent | Cumulative number | Cumulative per cent | Number | Per cent | Cumulative number | Cumulative per cent |
| Under 1 month | 47 | 11.5 | | | 43 | 12.5 | | |
| 1–2 months | 66 | 16.1 | 113 | 27.6 | 40 | 11.6 | 83 | 24.1 |
| 2–3 months | 66 | 16.1 | 179 | 43.7 | 37 | 10.8 | 120 | 34.9 |
| 3–4 months | 60 | 14.6 | 239 | 58.3 | 34 | 9.9 | 154 | 44.8 |
| 4–5 months | 43 | 10.5 | 282 | 68.8 | 26 | 7.6 | 180 | 52.4 |
| 5–6 months | 30 | 7.3 | 312 | 76.1 | 22 | 6.4 | 202 | 58.8 |
| 6–7 months | 28 | 6.9 | 340 | 83.0 | 27 | 7.9 | 229 | 66.7 |
| 7–8 months | 23 | 5.6 | 363 | 88.6 | 18 | 5.2 | 247 | 71.9 |
| 8–9 months | 18 | 4.4 | 381 | 93.0 | 31 | 9.0 | 278 | 80.9 |
| 9–10 months | 10 | 2.4 | 391 | 95.4 | 19 | 5.5 | 297 | 86.4 |
| 10–11 months | 7 | 1.7 | 398 | 97.1 | 7 | 2.0 | 304 | 88.4 |
| 11–12 months | 3 | .7 | 401 | 97.8 | 8 | 2.3 | 312 | 90.7 |
| Over 1 year | 6 | 1.5 | 407 | 99.3 | 29 | 8.4 | 341 | 99.1 |
| Not reported | 3 | .7 | 410 | 100.0 | 3 | .9 | 344 | 100.0 |

Less than 10 per cent of the workers who had secured permanent jobs had been reemployed by the same plants and for the same work from which they had been discharged. One hundred and thirty-four had found work in industries which produced products similar to those made at the plants which formerly employed them, while 273 were employed in industries entirely new to them, necessitating adjustment to an entirely new product. The jobs of 188 differed only slightly from those previously held, but 221 had jobs which were not related to their former ones. The report gives the following examples of the shifts made by the latter group:

Trained cutters with years of experience in clothing factories had become gasoline station attendants, watchmen in warehouses, time keepers in steel plants, and clerks in meat markets. An assistant foreman in a wire mill was driving a truck; a rotary-press operator was pressing clothes in a tailor shop; a machinist formerly in an envelope factory was selling hosiery for a mail-order house, and a lathe operator was running a mixer in a cement brick plant. One

licensed stationary engineer ultimately found a job as a caretaker in a public park, an operator of a welding machine became a farm hand, and an experienced spinner from a worsted yarn mill took on the job of radio repair man. A skilled German woodworker, who for many years had been employed in a piano factory, was mixing salves for a drug manufacturer at $20 a week. Many skilled clothing workers had opened cleaning and pressing establishments of their own. Seven of the men had taken up bootlegging. When interviewed, one was driving a truck which was being used for the illicit transportation of liquor. Another was selling whisky to friends and acquaintances.

Seventy-seven, or 18.8 per cent of the permanently employed workers, were earning more at their new jobs than they had at their last permanent employment; 197, or 48 per cent, were receiving lower wages; and 111, or 27.1 per cent, had about the same income.

The results of the survey led to the following conclusions, stated in the words of the report:

It should be evident from the material presented above that there is considerable mobility of labor at the present time and that the newer trades are absorbing a good percentage of the workers who are being discharged from the "older" industries. Absorption, however, is a relatively slow process. Those workers who do find new jobs are in a majority of instances compelled to remain idle for three months or more before finding new employment. When they do secure new jobs they frequently take them at a sacrifice in income. An appreciable portion of them, however, have been able to secure higher earnings in their new jobs than in their old.

It must be emphasized that the sample covered in this survey is much too small to justify any broad generalizations as to what is happening in modern industry. Without a sample many times larger than that which could be handled during the period at the disposal of the Institute of Economics, it would be foolhardy to generalize for industry as a whole. All that can be said is that the results described apply only to the group that has been surveyed. They show what has happened to a limited number of workers employed in over 20 industries. It is hoped that eventually more elaborate studies will throw some light upon whether the survey we have made is typical of the general trend.

## Three English Programs for the Treatment of Unemployment

WITHIN a few weeks of each other three publications appeared in England, two of which dealt exclusively with unemployment while the third gave it a prominent place. The first in order of time was the final report of the committee on industry and trade, under the chairmanship of Sir Arthur Balfour, appointed in 1924, the second was the report on unemployment of the conference on industrial reorganization and industrial relations, which has already done important work in regard to cooperation between employers and employees, and the third was the program set forth by the Liberal Party explaining the action it proposed to take in regard to unemployment if it were returned to power at the approaching elections, to be held May 30.

The attitude of the first body is largely negative. Its field of inquiry was the whole state of trade and industry, and it dealt with unemployment simply as one aspect of the general situation. Its general position is that the unemployment prevailing in Great Britain is a fairly normal development, brought about by a combination of cyclical depression and war results, which is likely to pass away without any radical measures of assistance if once industry can wake up to the fact that it has to meet present-day conditions and that it must depend

upon its own initiative and force to overcome the difficulties admittedly confronting it. The process will be painful, but that is inevitable. The only hope is to shorten it as much as possible by uniting the intelligence, the good will, and the energy of employers, employees, and the general public in bringing about the necessary readjustments. Schemes of State help, or radical changes in the relation of capital and labor are not only futile but actively harmful. A minority report dissents from these conclusions.

The second body, composed of employers and workers acting together, advocates a more positive program. Due to the changes brought about by the war, it holds, there is an actual surplus of labor in England at present, and this is likely to be increased by the measures of rationalization which must be taken if Britain is to regain its place in the world markets. A triple attack should be made upon this surplus by means of a bold and comprehensive emigration policy, by raising the school-leaving age, and by adopting a more liberal old-age pension policy to take the veterans out of industry. Trade and industry should be promoted by a system of export credit and trade facilities offered by the Government. Industry should be rationalized, and employers and trade-unions should confer together to find means of lessening the hardship involved in laying off workers who, under more efficient methods, will not be needed. Special measures should be adopted to relieve the situation in the coal-mining industry. Methods of rationalization, improvement of the currency and banking systems, and foreign policy in its bearing on English trade are to be discussed in future reports.

The third plan, the platform of the Liberal Party, contained nothing which had not already been advocated, but it was set forth with a clearness and an attention to detail which vitalized the whole question. The fact is recognized that the unemployment in Great Britain is due in part to world causes and that its permanent cure demands far-reaching changes in organization and in foreign policy which can not be hastily accomplished. But meanwhile, on the one hand there are over a million unemployed workers and on the other there are potential improvements which would immensely increase the productive assets of the country; why not bring the two together? As a beginning, take six major lines which would affect at once the industrial prosperity of the country, set the unemployed to work at these, get their wages into circulation, build up the transportation, housing, electrical and drainage systems of the country, and while this is going on begin planning and putting into gradual execution the wider policies which shall bring about a permanent restoration.

A more extended review of each of these three reports is given below:

### Final Report of the Balfour Committee

THE committee on industry and trade, commonly known as the Balfour Committee, appointed in 1924 to "inquire into the conditions and prospects of British industry and commerce, with special reference to the export trade," has added to the six interim reports already published a final volume of 388 pages, designed to give findings, recommendations, and conclusions upon the whole range of topics covered by its terms of reference. It is impossible, however, the

committee feel, to give any formal list of conclusions, since it had been necessary to consider a variety of subjects, each of which led to a number of recommendations, some advocating practical action and others deprecating measures which the committee felt would be harmful.

> The net result is a multiplicity of findings, some positive and some negative, some dealing with questions of principle and high policy, some with points of technical detail, of which the mutual connection and bearing on the central problem referred to us will not always be apparent without a comprehensive study of the whole report.

Among this "multiplicity of findings," probably those relating to unemployment and its possible remedies are of the most general importance. Unemployment is only one feature of a general industrial depression, and it has been made abundantly clear, the committee feel, that not one but many causes have combined to produce this situation. Among them are the growing tendency toward economic nationalism, the industrialization of formerly agricultural countries, the impoverishment and loss of purchasing power caused by the war and by the collapse of currencies which followed it, the increase of tariff and trade barriers, and the loss of good will due to the cutting off of outside markets during the period of hostilities. In addition, British industry has not yet adapted itself to the new conditions following the war. In brief, the present need is that means should be found of restoring the competitive power of British industry and trade without impairing the standard of living, and of enabling British exporters to place their products in external markets in sufficient volume and on terms acceptable to overseas buyers.

To accomplish this end, industry must be reconditioned, which will involve much scrapping and replacement of plant, with consolidations and regroupings to obtain the benefit of large-scale production, elimination of waste, standardization and simplification of practice, and all the other measures of economy usually included under the term "rationalization." On the other hand, in order to preserve those special characteristics of variety and quality of products which have been the main strength of British industry and commerce, it is necessary to impose severe limits on the extent "to which simplified methods of mass production or schemes of intensive amalgamation can be advantageously introduced into British manufacturing industry."

The program thus rather vaguely outlined demands liberal expenditure, and the committee admit that many of the most important depressed industries seem unable to command the capital to carry it through. Various suggestions to remedy this situation have been considered, "including such diverse proposals as tariff protection, currency reform, or the management of industrial enterprises by public authorities." As to the desirability of tariff protection, the committee disagreed, a minority advocating the repeal of the McKenna and safeguarding duties now in effect, while the majority considered that a clear case for abolition had not been made, but that a time limit for such duties should be set, with reconsideration of the industry's claims one year before the duty should expire.

Currency reform, in so far as it involves any departure from the gold standard, is to be condemned. Collective purchase of raw

materials is considered and dismissed as probably not practicable. "The management of basic industrial enterprises by public authorities" is wholly discountenanced. The basic industries, even the most depressed, have the power within themselves to carry through measures for their own regeneration, provided they are first convinced that such measures are essential and unavoidable, and that they must be undertaken by themselves without reliance on any outside authority. The nature of such measures depends on the circumstances of the particular industry in question.

> At all costs, power of access to new capital must be regained, and for this purpose measures of financial reconstruction, writing down of capital and amalgamation with other undertakings, so as to increase the size of the business unit, are or may be among the essential measures to be taken, painful as some of them may be. * * *
>
> As the aim of reconstruction must be to operate the most efficient works full time, the result will be to afford the maximum amount of full employment and at the same time to diminish the number of part-time workers. Such a policy in its early stages may involve an actual increase in the number wholly unemployed, and all possible steps should be taken to mitigate any hardship incidental to the transition.

As to how such hardship is to be mitigated, the committee has nothing to say. Public provision of productive work for the unemployed had been discussed in an earlier section of the report, and rejected as not being practicable except within very narrow limits. The committee is sure, however, that in the long run the industries which have regained their prosperity will be more than able to reabsorb the workers who have been displaced by the process of reorganization.

Two members of the committee found themselves wholly unable to sign the report, and five others signed it subject to a memorandum presented by the group of seven. The seven dissenters state their position as follows:

> What we can not accept is the view, running right through the report, that nothing can or need be done by way of fundamental modification of the traditional approach to national economy and the assumption that private enterprise and free competition can be left, by themselves, gradually to right things.

The fallacy of such a view, they feel, is evidenced by the steady worsening of the industrial situation during the time the committee has been at work, and they see no prospect of improvement except through a pronounced change of attitude. Reorganization is necessary, and should be carried through under State guidance to secure the benefits of a coherent and consistent plan and to avoid the loss and delay involved in waiting for each industry and undertaking to become convinced of the necessity for its own modification or, perhaps, its absorption. Also, State guidance is needed in order that the gains of reorganization may not be monopolized by groups, sections, or individuals, but as far as possible diffused through the community. Moreover, the State has a special duty in regard to unemployment.

> Incumbent on the State further is the obligation to facilitate and support reorganization by national measures, both temporary (maintenance of the unemployed) and permanent (measures of national reequipment).

For these purposes two new bodies should be created, a national economic committee and a national employment and development

board. It should be the duty of the first "to know the facts in a scientific way and see them as a whole" and of the second to see that the plans worked out by the first in conjunction with the industries themselves are actually initiated within a time limit and carried through to the public interest. The importance of State control over land, transport, and electricity is emphasized, and stress is laid on the development of such types of public policy as the export credits scheme.

### Report of the Melchett-Turner Conference

CLOSELY following the publication of the Balfour report came the interim report on unemployment issued by the conference made up of a group of employers, headed by Lord Melchett, and of representatives of the Trades-Union Congress under the chairmanship of Mr. Turner, commonly known as the Melchett-Turner Conference. Taking up the admitted facts of the present situation, the report gives some consideration to causes, but is mainly devoted to possible remedies, with a distinction between the special measures for immediate adoption and the basic remedies, which are to be more fully discussed in a later report.

The causes of the present situation are threefold: First, there is the basic factor of cyclical unemployment, intensified by the monetary policy adopted; second, there are the general changes due to the World War and the slowness of British industries to adapt themselves to the new conditions; and third, there is a temporary displacement of workers due to the adoption of labor-saving methods, a factor which has had some effect already, but which is likely to be far more important during the next few years if British industry succeeds in rationalizing itself.

As to how the situation should be met, the conference offers this summary of recommendations:

1. A comprehensive inquiry into the consolidation of existing pensions and insurance funds should be immediately set up by the Government.
2. Funds for assisting emigration should be largely increased and found by loan instead of out of revenue. These funds should be under the control of a committee of representatives of industry under the chairmanship of a minister and similar committees should be set up in the Dominions. A program extending over a period of 20 years should be aimed at in the scheme of settlement. Emigration by groups or community should be undertaken. Emigration policy should be coordinated by a joint committee for the British Commonwealth with representatives of employers and trade-unions upon it.
3. Unemployment in the mining industry should be considered as a special case and relief measures and schemes should be continued at an accelerated rate.
4. Orders for Government and municipal departments should be placed in this country under properly regulated and coordinated conditions.
5. Trade facilities should be reinstituted under more liberal conditions.
6. A Crown colonies development committee should be formed for purposes of development and the placing of orders for plant in Britain.
7. Export credits should be extended in reasonable cases in order to achieve the greater stimulation of immediate purchasing power.
8. Augmented pensions out of national insurance and pension funds should be made available to workers of 65 and over who cease work, such pensions to be supplemented by employers when conditions permit.
9. The Government should create and maintain a development fund capable of financing important national schemes.
10. Further extension of constructional schemes of a permanent character should be undertaken and existing schemes hastened in their application.

11. Rationalization in the widest sense of the term should be pressed forward as rapidly as possible involving consultation with trade-unions. The changes involved in rationalization should be introduced gradually and the trade-unions should be consulted as to the best method of dealing with displacement. Firms or industries, where possible, should set up a labor reserve fund out of profits to assist displaced workers.

12. Means should be explored for establishing a more authoritative contact between agriculture and industry.

13. Serious consideration should be given to the question of raising the school-leaving age.

14. A Government inquiry into currency and banking policy, to be participated in by representatives of industry and finance, should be undertaken immediately.

15. Every effort should be made by the Treasury and the Bank of England to have the recommendations of the Genoa Conference put into operation.

Of these recommendations the eleventh, fourteenth and fifteenth are classed as "main remedies," to be considered more fully in subsequent reports. Numbers four, five, six, and seven are of special interest to the employing section, and a plea is made for their adoption and liberal construction. Trade facilities, especially, might be far more effectively administered than has been the case.

The larger aspect has been somewhat too much disregarded, but it is felt that trade facilities are among the most important immediately applicable and potent instruments the nation possesses * * * of placing national credit behind trade depression in a moment of crisis, just as national credit placed behind the Government was the stay and support during the crisis of the war.

### Emigration

Three of the recommendations deal with the question of reducing the number of potential workers for whom at the present there is no work, the first of these concerning emigration. There is no question, the conferees think, that "there is a direct connection between the greatly decreased rate of emigration since the war, and the enormous volume of unemployment that now exists." The help so far given to emigration has been entirely inadequate. It is suggested that the Government might buy a large tract of land in Canada on a system of deferred payments, according to the number of emigrants, and arrangements should be made systematically to cover a period of 20 years. Community or group emigration should be fostered, to do away with the loneliness which those migrating singly fear. One hindrance to migration is the financial difficulty of getting through the first few years, and loans under proper safeguards against fraud are urged to tide the settlers over this period.

### Taking the Old and the Young Out of Industry

The second recommendation for reducing the number of superfluous workers begins with a discussion of the anomaly of keeping old men employed while young men are out of work. The old age pension of 10s. a week is not enough for a man to live on, so a man of 65 and over clings to his job, if possible, while young people in the prime of their strength search for something to do. Obviously, a man under 50 should be a more productive worker than one over 65.

It is, therefore, very desirable that if a surplus of labor has to be supported for more than a short transition period, the funds necessary for such support should be expended in pensioning older workers rather than in paying benefits

to young and vigorous workers who are unemployed. It is surely much better to keep the younger workers in employment, and offer inducements which will assist in retiring the surplus labor at an upper age limit, for instance, 65.

Further, it is suggested that a comprehensive inquiry should be made into the desirability of combining the various social insurance schemes into one, together with the money at present expended under the poor law and the old age pensions act.

It is felt that the present separation in water-tight compartments operates against the most economic use of provision, whether made by the employer, the worker, or the State.

It is hoped as the result of an actuarial investigation which is at the present time being made on behalf of the joint committee to show that with no addition to existing contributions from the workers or the employers, it should be possible to provide adequate pensions at the age of 65. Thereby the pressure on the labor market would be relieved, employment would be provided for younger persons, and the national prosperity improved.

Pensions on the increased scale should not be payable unless the pensioner ceased work, so that they could not be used to lower wages. By thus taking the recipients out of the field, a very considerable relief would be obtained, "since it is estimated that there are 340,000 persons in industry aged 65 or over (including agriculture, but excluding private domestic service)."

The third plan proposed for lessening the number of would-be workers is to raise the age for leaving school to 15 years. This is recommended on both educational and economic grounds. It would at once remove approximately 500,000 juveniles from the labor market, and might mean the absorption into industry of 200,000 adults.

### Provision for Displaced Labor

While rationalization is considered necessary, it is admitted that its temporary effect must be the displacement of large numbers of workers. It is urged that care should be taken to make the inevitable changes in such a way that the least possible disturbance is caused to the labor employed, and that the steps taken to safeguard the workers should proceed simultaneously with the changes leading to displacement.

In all cases efforts should be made to find employment for displaced workers in other positions, under at least equal conditions as those formerly enjoyed, or to transfer them to positions in other establishments controlled by the same firm.

### Immediate Work Schemes

In conclusion, the report urges the immediate adoption of a number of practical steps. The execution of necessary public work of a permanent character is advised, and the construction of roads, canals, bridges, tunnels, and harbors, and the carrying out of drainage schemes are cited as examples of work which might relieve the present situation. Constructional schemes which have been already approved should be pressed forward. Building up Britain's foreign trade is highly important, and for this purpose export credits should be extended in reasonable cases, and the Dominions should be encouraged to order from the home country rather than from foreign sources. Several subjects were specifically reserved for further consideration.

The report was adopted by all the members of the conference on both sides, except one.

[1410]

## A Party Program for the Cure of Unemployment

ALMOST coincidently with the publication of these two reports, the Liberal Party issued a booklet entitled, "We Can Conquer Unemployment," setting forth the measures by which they would undertake to reduce unemployment to normal proportions within two years, with little or no increase in taxation. The gist of the policy lies in the fact that it is cheaper, more humane, and more efficient to pay people for working than for being idle.

Nothing, we think, will strike the future historian more than the waste of our present unemployment policy. If the country allowed the unemployed to starve and die, it would at least be logical, though inhuman. But when humanity demands that we maintain them, why not make use of their service? In two neighboring Welsh towns, with a combined population of some 25,000, the employment exchanges alone (without reference to poor relief or charity or trade-union or other benefits) have paid out since 1920 no less than £1,125,000, for which there is nothing whatsoever to show except the bare maintenance of those receiving these unemployment benefits.

Obviously, it is better to employ the workers in providing reproductive assets for the nation than to maintain them in impoverished idleness. As to how this can be done, the pamphlet sets forth in detail six principal schemes which might well be undertaken at once, and gives the estimated number they would absorb, as follows:

NUMBER OF WORKERS TO BE EMPLOYED WITHIN FIRST AND SECOND YEAR FROM START OF SCHEME

| Nature of scheme | Within first year | Within second year |
|---|---|---|
| Roads and bridges | 350,000 | 375,000 |
| Housing | 60,000 | 60,000 |
| Telephone development | 60,000 | 60,000 |
| Electrical development | 62,000 | 62,000 |
| Land drainage | 30,000 | 30,000 |
| London passenger transport | 24,000 | 24,000 |

The program of road and bridge building is given first place, partly because of the great need for development along this line, partly because road work is peculiarly fitted for a time of abnormal unemployment, partly because a fund for road building already exists and a comprehensive program has been worked out, and partly because better transportation facilities are a condition precedent to some of the other measures proposed. The need for action is undisputed. As early as 1909 a program of development was proposed and a road fund established. The coming of the war interfered with the prosecution of these plans. In 1920 a Ministry of Transport was established and large schemes of road improvement were initiated, but after the change in Government in 1925, the work slowed down and the road fund was "raided" for other purposes. The policy here urged is the resumption of the earlier program with increased vigor. Maps are presented for England, Wales, and Scotland, picturing the road scheme for the whole country, and showing just what has already been done, what it is proposed to do, where the work will be taken up, and what each part of it will cost. The program has been worked out in detail, and is supported by expert and technical opinion.

The special advantages of beginning with this program are that it will employ a large variety of labor, widely spread over the country, and that a high percentage of the expenditure will go for wages.

Expert opinion is that some 80 per cent of total expenditure represents amounts paid directly or indirectly in wages. This would mean some 5,500 men per £1,000,000 of total expenditure. Of these, from 2,000 to 2,500 would be employed directly and the remainder in production of materials and their transport. A very safe total figure is 5,000 men per annum for every £1,000,000.

The cost of the special road and bridge work outlined would be for the first two years £145,000,000. This should be raised as a loan secured by the increasing income of the road fund. The net income of the fund, raised by taxation of motor vehicles, was over £21,000,000 in 1927–28.

There would clearly be no difficulty in raising a loan up to, say, £200,000,000 upon the security of this fund; and in so far as the proceeds were used in expediting necessary work of road improvement which would have to be carried out in any event over the next 10 years, it would be perfectly proper to charge the interest and sinking fund against the future income of the road fund. There would, however, be available for this purpose not only the rapidly increasing annual income, but also the increasing capital values which should be appropriated under suitable "betterment" legislation. Thus, these proposals could be carried through without any additional charge in the way of taxation.

The other programs are worked out with equal attention to detail, but the methods of raising the necessary capital vary. For housing, it would be raised, as heretofore, by local authorities. For telephone development an additional expenditure of £30,000,000 in two years is recommended, for electrical development £24,000,000, and for London tube schemes, £17,000,000. These amounts would be raised in the ordinary way of business, with, perhaps, reduced interest at the State's expense. The cost of land drainage would have to be borne in the main by the public, but against this must be set the saving involved in lowering the expenditure for unemployment benefits, estimated at approximately £30,000,000; also, the increased taxable value of the land thus improved must be taken into consideration.

## Unemployment in Germany, February, 1929

WHOLE and part time unemployment among the members of the labor unions and also the number of the workers insured against unemployment receiving benefits—regular benefits and crisis, or panic, benefits are shown in the following tables. Crisis or panic benefits, called "Krisenunterstützung," are paid to those insured unemployed workers who have already exhausted their regular benefits. The figures are taken from Wirtschaft und Statistik for the second half of March, 1929 (pp. 261, 262).

It should be noted that the unusual cold weather, especially during the months of January and February of this year, accounts in part for the rapid increase of unemployment in these months. For instance, in the building trade, which consists principally of outside work, the unemployment in February, 1929, amounted to 71.7 per cent among the members of the building-trades labor unions.

TABLE 1.—WHOLE AND PART TIME UNEMPLOYMENT AMONG MEMBERS OF LABOR UNIONS ON FEBRUARY 28, 1929

| Industry | Membership | Wholly unemployed | | Partly unemployed | |
|---|---|---|---|---|---|
| | | Number | Per cent | Number | Per cent |
| Production goods: | | | | | |
| Mining | 159,800 | 5,200 | 3.2 | 7,700 | 4.8 |
| Metal trades | 1,028,000 | 108,900 | 10.6 | 103,100 | 10.0 |
| Chemical | 123,600 | 11,600 | 9.4 | 5,000 | 4.0 |
| Building | 676,200 | 484,600 | 71.7 | 10,600 | 1.6 |
| Woodworking | 315,700 | 73,000 | 23.1 | 39,700 | 12.6 |
| Paper | 65,100 | 4,300 | 6.7 | 2,800 | 4.3 |
| Printing | 146,600 | 9,600 | 6.5 | 1,200 | .9 |
| Leather | 43,400 | 6,700 | 15.3 | 13,600 | 31.4 |
| Total Feb. 28, 1929 | 2,558,400 | 703,900 | 27.5 | 183,700 | 7.2 |
| Jan. 31, 1929 | 2,539,000 | 617,400 | 24.3 | 171,200 | 6.7 |
| Feb. 29, 1928 | 2,332,300 | 307,500 | 13.2 | 54,600 | 2.3 |
| Consumption goods: | | | | | |
| Textiles | 380,300 | 32,000 | 8.4 | 98,700 | 26.0 |
| Clothing | 171,100 | 39,400 | 23.0 | 43,900 | 26.7 |
| Shoes | 75,400 | 17,400 | 23.0 | 26,000 | 37.7 |
| Leather | 28,800 | 6,500 | 22.7 | 4,500 | 15.6 |
| Food | 305,200 | 41,600 | 13.6 | 34,900 | 11.4 |
| Tobacco | 98,700 | 21,000 | 21.3 | 26,200 | 26.6 |
| Paper | 58,900 | 6,200 | 10.5 | 9,600 | 16.3 |
| Ceramic | 206,500 | 62,400 | 30.2 | 17,400 | 8.4 |
| Glass | 55,900 | 7,800 | 13.9 | 3,300 | 6.0 |
| Porcelain | 49,700 | 5,800 | 11.7 | 9,200 | 18.6 |
| Total Feb. 28, 1929 | 1,150,800 | 188,100 | 16.3 | 209,000 | 18.3 |
| Jan. 31, 1929 | 1,154,100 | 166,200 | 14.4 | 203,200 | 17.6 |
| Feb. 29, 1928 | 1,092,600 | 82,300 | 7.5 | 86,900 | 7.9 |
| Communication and transportation: | | | | | |
| Feb. 28, 1929 | 370,400 | 27,000 | 7.3 | 3,600 | 1.0 |
| Jan. 31, 1929 | 364,300 | 25,300 | 7.0 | 3,400 | .9 |
| Feb. 29, 1928 | 327,300 | 16,800 | 5.1 | 5,100 | 1.6 |
| Other industries: | | | | | |
| Feb. 28, 1929 | 469,300 | 96,800 | 20.6 | 10,800 | 2.3 |
| Jan. 31, 1929 | 448,000 | 66,700 | 14.9 | 15,800 | 3.5 |
| Feb. 28, 1928 | 408,500 | 25,200 | 6.1 | 5,000 | 1.2 |
| Total, all industries: | | | | | |
| Feb. 28, 1929 | 4,548,900 | 1,015,800 | 22.3 | 407,100 | 9.0 |
| Jan. 29, 1929 | 4,505,400 | 875,600 | 19.4 | 393,600 | 8.7 |
| Feb. 28, 1928 | 4,160,700 | 431,800 | 10.4 | 151,600 | 3.6 |

TABLE 2.—NUMBER RECEIVING UNEMPLOYMENT BENEFITS, JANUARY 31 TO MARCH 15, 1929

| Date | Number receiving regular benefits | | | Number receiving crisis or panic benefits | | |
|---|---|---|---|---|---|---|
| | Male | Female | Total | Male | Female | Total |
| Jan. 31, 1929 | | | 2,246,000 | 121,269 | 24,090 | 145,359 |
| Feb. 15, 1929 | 2,026,541 | 329,282 | 2,355,823 | 129,196 | 25,093 | 154,289 |
| Feb. 28, 1929 | 2,124,703 | 336,057 | 2,460,760 | 135,255 | 26,238 | 161,493 |
| Mar. 15, 1929 | 1,996,748 | 327,797 | 2,324,545 | 148,594 | 28,749 | 177,343 |

## Transfer of Unemployed from the Cities to the Rural Districts in the Netherlands [1]

IN VIEW of the favorable results obtained from the transfer of about 1,000 unemployed workers from the cities of Amsterdam, Utrecht, Hague, and Rotterdam to the rural districts during 1928,

[1] Telegraaf, Amsterdam, morning edition, Mar. 27, 1929, as reported by Mr. George Tait, American vice consul at Rotterdam, Apr. 9, 1929.

the Netherlands Government has made arrangements with these and other municipalities for the transfer of unemployed workers during 1929.

The work in the rural districts would consist principally of land reclamation, road making, canal and bridge construction, etc. The stipulated conditions of work and living of the unemployed in the rural districts are as follows:

The workers will be housed on farms suitable for this purpose, each having space to lodge from 50 to 75 workers. Five barracks, especially built for this purpose and each providing quarters for 100 persons, were erected in the Province of Drenthe. These barracks are divided into small houses, each lodging eight persons, and having a joint living room and separate bedrooms. A cook, with his wife and assistants, looks after the food supply of a "settlement" of 100 persons, all the necessary materials being available. Sanitary provisions, such as running water, lavatories, etc., have been made and the welfare of the workers safeguarded by every reasonable means. Similar settlements are located in the Province of Overysel.

Practically all work is to be performed on a piecework basis. After some training the average wages are 15 florins ($6.03) for a week of 50 hours. In addition to this, the government and municipalities provide a bonus of 75 per cent, so that the total wages will average 26.25 florins ($10.55). During the training period, which will probably extend over a period of four weeks, a training bonus of, respectively, 10, 7.5, 5, and 2.5 Dutch cents (4, 3, 2, and 1 American cents) per hour will be added. No training bonus is paid to persons who have worked under this plan for a period longer than six weeks.

Every other week the workers are provided with free transportation to their homes in the cities. They leave Friday night after work is finished and return Monday morning. On the Saturday on which the workers do not return to their homes, their wives receive 17.50 florins ($7.04) from the wages of the previous week, or correspondingly less if the wages were below 23.85 florins ($9.59).

The amount of 3.85 florins ($1.55) is deducted from the weekly wages for the furnishing of warm food, coffee, tea, etc., and for the cleaning and heating of the house. The workers must purchase their own bread, for which purpose a baker calls daily. The cook is not allowed to arrange for the purchase of bread.

Each worker must provide his own tools. Since the nature of the soil varies according to locality, it is advisable that implements be purchased on the spot. Any damage to house or contents as a result of carelessness, negligence, or malice, must be paid in full by the person responsible.

Although the mixed composition of the various settlements may lead to a certain amount of friction, it is not expected that serious difficulties will be encountered. Every settlement will have a committee of three or four workers, appointed by the trade-unions, and any complaints or demands reaching these committees, from either organized or unorganized workers, will be submitted to the trade-unions which, in turn, will take the question up with the proper authorities.

## Days Employment per Worker in Russian Industry

THE following table shows how the average days per worker in a working year are distributed—as to employment, holidays, days laid off, etc.—in large-scale industries in the Province (Gubernia) of Moscow during the five years from 1923–24 to 1927–28. The figures are taken from the Statistical Economic Handbook of the City and Province of Moscow for 1923–24—1927–28 (p. 158). There were 522,800 workers in large-scale industries in the Province of Moscow on January 1, 1928.

DISTRIBUTION OF WORKING YEAR PER WORKER IN LARGE-SCALE INDUSTRIES IN THE PROVINCE OF MOSCOW, 1923–24 TO 1927–28

| Item | Average number of days per worker | | | | |
|---|---|---|---|---|---|
| | 1923–24 | 1924–25 | 1925–26 | 1926–27 | 1927–28 |
| Days actually worked | 256.2 | 257.2 | 256.8 | 263.7 | 266.6 |
| Days of rest (holidays) | 66.4 | 66.4 | 63.9 | 63.7 | 62.9 |
| Days laid off | 1.4 | .8 | 2.8 | 1.0 | .4 |
| Days not worked, other causes | 42.0 | 40.6 | 41.5 | 36.6 | 36.1 |
| Organization work | 1.3 | 1.1 | .7 | .6 | .7 |
| Vacations | 14.8 | 15.5 | 15.0 | 13.8 | 13.6 |
| Sickness | 18.1 | 18.7 | 19.2 | 17.6 | 17.5 |
| Voluntary absence, excusable | 4.3 | 1.8 | 2.8 | 1.7 | 1.9 |
| Voluntary absence, inexcusable | 3.5 | 3.5 | 3.8 | 2.9 | 2.4 |

# WHOLESALE AND RETAIL PRICES

## Retail Prices of Food in the United States

THE following tables are compiled from monthly reports of actual selling prices [1] received by the Bureau of Labor Statistics from retail dealers.

Table 1 shows for the United States retail prices of food April 15, 1928, March 15, and April 15, 1929, as well as the percentage changes in the year and in the month. For example, the retail price per quart of fresh milk was 14.1 cents on April 15, 1928; 14.3 cents on March 15, 1929; and 14.2 cents on April 15, 1929. These figures show an increase of 1 per cent in the year and a decrease of 1 per cent in the month.

The cost of various articles of food combined shows a decrease of 0.3 per cent April 15, 1929, as compared with April 15, 1928, and a decrease of 0.9 per cent April 15, 1929, as compared with March 15, 1929.

TABLE 1.—AVERAGE RETAIL PRICES OF SPECIFIED FOOD ARTICLES AND PER CENT OF INCREASE OR DECREASE APRIL 15, 1929, COMPARED WITH MARCH 15, 1929, AND APRIL 15, 1928

[Percentage changes of five-tenths of 1 per cent and over are given in whole numbers]

| Article | Unit | Average retail price on— | | | Per cent of increase (+) or decrease (−) Apr. 15, 1929, compared with— | |
|---|---|---|---|---|---|---|
| | | Apr. 15, 1928 | Mar. 15, 1929 | Apr. 15, 1929 | Apr. 15, 1928 | Mar. 15, 1929 |
| | | *Cents* | *Cents* | *Cents* | | |
| Sirloin steak | Pound | 45.3 | 47.9 | 49.0 | +8 | +2 |
| Round steak | do | 39.6 | 42.2 | 43.4 | +10 | +3 |
| Rib roast | do | 33.4 | 35.5 | 36.3 | +9 | +2 |
| Chuck roast | do | 26.1 | 28.8 | 29.5 | +13 | +2 |
| Plate beef | do | 17.9 | 20.3 | 20.6 | +15 | +1 |
| Pork chops | do | 31.3 | 35.2 | 37.2 | +19 | +6 |
| Bacon, sliced | do | 42.9 | 42.9 | 43.3 | +1 | +1 |
| Ham, sliced | do | 50.6 | 54.3 | 54.7 | +8 | +1 |
| Lamb | do | 39.7 | 40.9 | 41.8 | +5 | +2 |
| Hens | do | 37.7 | 40.5 | 41.8 | +11 | +3 |
| Salmon, canned, red | do | 35.4 | 31.4 | 31.4 | −11 | 0 |
| Milk, fresh | Quart | 14.1 | 14.3 | 14.2 | +1 | −1 |
| Milk, evaporated | 16-oz. can | 11.1 | 11.4 | 11.1 | 0 | −3 |
| Butter | Pound | 55.1 | 58.3 | 55.7 | +1 | −4 |
| Oleomargarine (all butter substitutes.) | do | 27.2 | 27.5 | 27.4 | +1 | −0.4 |
| Cheese | do | 38.2 | 38.2 | 38.1 | −0.3 | −0.3 |
| Lard | do | 17.8 | 18.4 | 18.5 | +4 | +1 |
| Vegetable lard substitute | do | 24.9 | 24.8 | 24.8 | −0.4 | 0 |
| Eggs, strictly fresh | Dozen | 35.8 | 42.1 | 36.8 | +3 | −13 |
| Bread | Pound | 9.1 | 9.0 | 9.0 | −1 | 0 |

[1] In addition to monthly retail prices of food and coal, the bureau publishes the prices of gas and electricity from each of 51 cities for the dates for which these data are secured.

TABLE 1.—AVERAGE RETAIL PRICES OF SPECIFIED FOOD ARTICLES AND PER CENT OF INCREASE OR DECREASE APRIL 15, 1929, COMPARED WITH MARCH 15, 1929, AND APRIL 15, 1928—Continued

| Article | Unit | Average retail price on— | | | Per cent of increase (+) or decrease (−) Apr. 15, 1929, compared with— | |
|---|---|---|---|---|---|---|
| | | Apr. 15, 1928 | Mar. 15, 1929 | Apr. 15, 1929 | Apr. 15, 1928 | Mar. 15, 1929 |
| | | *Cents* | *Cents* | *Cents* | | |
| Flour | Pound | 5.4 | 5.1 | 5.1 | −6 | 0 |
| Corn meal | do | 5.3 | 5.3 | 5.3 | 0 | 0 |
| Rolled oats | do | 8.9 | 8.9 | 8.9 | 0 | 0 |
| Corn flakes | 8-oz. package | 9.6 | 9.5 | 9.5 | −1 | 0 |
| Wheat cereal | 28-oz. package | 25.6 | 25.5 | 25.5 | −0.4 | 0 |
| Macaroni | Pound | 19.8 | 19.6 | 19.6 | −1 | 0 |
| Rice | do | 10.0 | 9.8 | 9.7 | −3 | −1 |
| Beans, navy | do | 11.5 | 14.0 | 14.2 | +23 | +1 |
| Potatoes | do | 3.5 | 2.3 | 2.3 | −34 | 0 |
| Onions | do | 7.4 | 8.4 | 8.2 | +11 | −2 |
| Cabbage | do | 6.8 | 5.7 | 5.2 | −24 | −9 |
| Beans, baked | No. 2 can | 11.4 | 11.9 | 11.9 | +4 | 0 |
| Corn, canned | do | 15.9 | 15.9 | 15.8 | −1 | −1 |
| Peas, canned | do | 16.7 | 16.7 | 16.7 | 0 | 0 |
| Tomatoes, canned | do | 11.7 | 13.0 | 13.1 | +12 | +1 |
| Sugar | Pound | 7.1 | 6.5 | 6.4 | −10 | −2 |
| Tea | do | 77.2 | 77.7 | 77.6 | +1 | −0.1 |
| Coffee | do | 48.9 | 49.6 | 49.6 | +1 | 0 |
| Prunes | do | 13.6 | 14.3 | 14.3 | +5 | 0 |
| Raisins | do | 13.6 | 11.6 | 11.5 | −15 | −1 |
| Bananas | Dozen | 33.0 | 32.1 | 31.8 | −4 | −1 |
| Oranges | do | 55.2 | 38.7 | 39.7 | −28 | +3 |
| Weighted food index | | | | | −0.3 | −0.9 |

Table 2 shows for the United States average retail prices of specified food articles on April 15, 1913, and on April 15, of each year from 1923 to 1929, together with percentage changes in April of each of these specified years, compared with April, 1913. For example, the retail price per pound of butter was 40.4 cents in April, 1913; 57.3 cents in April, 1923; 50.1 cents in April, 1924; 53.3 cents in April, 1925; 50.9 cents in April, 1926; 58.4 cents in April, 1927; 55.1 cents in April, 1928; and 55.7 cents in April, 1929.

As compared with April, 1913, these figures show increases of 42 per cent in April, 1923; 24 per cent in April, 1924; 32 per cent in April, 1925; 26 per cent in April, 1926; 45 per cent in April, 1927; 36 per cent in April, 1928; and 38 per cent in April, 1929.

The cost of the various articles of food combined showed an increase of 54.6 per cent in April, 1929, as compared with April, 1913.

TABLE 2.—AVERAGE RETAIL PRICES OF SPECIFIED FOOD ARTICLES AND PER CENT OF INCREASE APRIL 15 OF CERTAIN SPECIFIED YEARS COMPARED WITH APRIL 15, 1913

[Percentage changes of five-tenths of 1 per cent and over are given in whole numbers]

| Article | Average retail price on Apr. 15— | | | | | | | | Per cent of increase Apr. 15 of each specified year compared with Apr. 15, 1913 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1913 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | | | | | | | |
| Sirloin steak..pound.. | 25.5 | 37.9 | 39.6 | 40.4 | 41.1 | 41.8 | 45.3 | 49.0 | 49 | 55 | 58 | 61 | 64 | 78 | 92 |
| Round steak....do.... | 22.2 | 32.3 | 33.6 | 34.6 | 35.2 | 36.4 | 39.6 | 43.4 | 45 | 51 | 56 | 59 | 64 | 78 | 95 |
| Rib roast.....do.... | 20.0 | 27.8 | 29.0 | 29.7 | 30.2 | 30.9 | 33.4 | 36.3 | 39 | 45 | 49 | 51 | 55 | 67 | 82 |
| Chuck roast.....do.... | 16.2 | 19.7 | 20.9 | 21.6 | 22.3 | 23.3 | 26.1 | 29.5 | 22 | 29 | 33 | 38 | 44 | 61 | 82 |
| Plate beef.....do.... | 12.2 | 12.7 | 13.3 | 13.8 | 14.7 | 15.2 | 17.9 | 20.6 | 4 | 9 | 13 | 20 | 25 | 47 | 69 |
| Pork chops.....do.... | 21.6 | 28.4 | 28.7 | 36.8 | 38.3 | 36.9 | 31.3 | 37.2 | 31 | 33 | 70 | 77 | 71 | 45 | 72 |
| Bacon, sliced....do.... | 26.8 | 39.1 | 36.2 | 46.6 | 48.5 | 48.1 | 42.9 | 43.3 | 46 | 35 | 74 | 81 | 79 | 60 | 62 |
| Ham, sliced.....do.... | 26.5 | 45.1 | 44.3 | 53.5 | 54.5 | 56.7 | 50.6 | 54.7 | 70 | 67 | 102 | 106 | 114 | 91 | 106 |
| Lamb, leg of....do.... | 20.2 | 36.2 | 38.8 | 38.6 | 37.9 | 40.0 | 39.7 | 41.8 | 79 | 92 | 91 | 88 | 98 | 97 | 107 |
| Hens.....do.... | 22.2 | 36.1 | 36.1 | 37.9 | 40.5 | 38.9 | 37.7 | 41.8 | 63 | 63 | 71 | 82 | 75 | 70 | 88 |
| Salmon, canned, red .....pound.. | ..... | 31.2 | 31.1 | 31.2 | 37.8 | 32.7 | 35.4 | 31.4 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Milk, fresh.....quart.. | 8.9 | 13.6 | 13.8 | 13.8 | 13.9 | 14.0 | 14.1 | 14.2 | 53 | 55 | 55 | 56 | 57 | 58 | 60 |
| Milk, evaporated .....16-ounce can.. | ..... | 12.2 | 11.8 | 11.2 | 11.5 | 11.4 | 11.1 | 11.1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Butter.....pound.. | 40.4 | 57.3 | 50.1 | 53.3 | 50.9 | 58.4 | 55.1 | 55.7 | 42 | 24 | 32 | 26 | 45 | 36 | 38 |
| Oleomargarine (all butter substitutes) .....pound.. | ..... | 28.3 | 29.3 | 30.1 | 30.5 | 28.6 | 27.2 | 27.4 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cheese.....do.... | 22.0 | 36.3 | 35.6 | 36.5 | 36.5 | 37.1 | 38.2 | 38.1 | 65 | 62 | 66 | 66 | 69 | 74 | 73 |
| Lard.....do.... | 15.8 | 17.5 | 17.2 | 23.2 | 21.5 | 19.1 | 17.8 | 18.5 | 11 | 9 | 47 | 36 | 21 | 13 | 17 |
| Vegetable lard substitute.....pound.. | ..... | 22.6 | 24.5 | 25.9 | 25.7 | 25.1 | 24.9 | 24.8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Eggs, strictly fresh .....dozen.. | 25.2 | 34.4 | 32.1 | 38.1 | 38.6 | 33.9 | 35.8 | 36.8 | 37 | 27 | 51 | 53 | 35 | 42 | 46 |
| Bread.....pound.. | 5.6 | 8.7 | 8.7 | 9.4 | 9.4 | 9.4 | 9.1 | 9.0 | 55 | 55 | 68 | 68 | 68 | 63 | 61 |
| Flour.....do.... | 3.3 | 4.9 | 4.6 | 6.1 | 6.1 | 5.5 | 5.4 | 5.1 | 48 | 39 | 85 | 85 | 67 | 64 | 55 |
| Corn meal.....do.... | 2.9 | 4.0 | 4.4 | 5.5 | 5.1 | 5.1 | 5.3 | 5.3 | 38 | 52 | 90 | 76 | 76 | 83 | 83 |
| Rolled oats.....do.... | ..... | 8.8 | 8.8 | 9.3 | 9.1 | 9.0 | 8.9 | 8.9 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Corn flakes ...8-ounce package.. | ..... | 9.7 | 9.7 | 11.0 | 11.0 | 10.2 | 9.6 | 9.5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Wheat cereal ...28-ounce package.. | ..... | 24.6 | 24.3 | 24.6 | 25.4 | 25.4 | 25.6 | 25.5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Macaroni.....pound.. | ..... | 19.8 | 19.5 | 20.4 | 20.2 | 20.0 | 19.8 | 19.6 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Rice.....do.... | 8.6 | 9.4 | 9.8 | 11.0 | 11.7 | 10.7 | 10.0 | 9.7 | 9 | 14 | 28 | 36 | 24 | 16 | 13 |
| Beans, navy....do.... | ..... | 11.4 | 9.8 | 10.4 | 9.3 | 9.1 | 11.5 | 14.2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Potatoes.....do.... | 1.5 | 2.5 | 2.8 | 2.4 | 6.7 | 3.7 | 3.5 | 2.3 | 67 | 87 | 60 | 347 | 147 | 133 | 53 |
| Onions.....do.... | ..... | 6.5 | 5.9 | 6.9 | 6.3 | 7.4 | 7.4 | 8.2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Cabbage.....do.... | ..... | 8.4 | 7.1 | 5.5 | 7.4 | 5.5 | 6.8 | 5.2 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Beans, baked .....No. 2 can.... | ..... | 13.0 | 12.7 | 12.6 | 12.0 | 11.6 | 11.4 | 11.9 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Corn, canned...do.... | ..... | 15.4 | 15.8 | 18.0 | 16.5 | 15.8 | 15.9 | 15.8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Peas, canned....do.... | ..... | 17.5 | 18.0 | 18.5 | 17.6 | 17.0 | 16.7 | 16.7 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Tomatoes, canned .....No. 2 can.. | ..... | 12.9 | 12.9 | 13.9 | 12.0 | 12.1 | 11.7 | 13.1 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sugar, granulated .....pound.. | 5.4 | 10.6 | 9.9 | 7.5 | 6.6 | 7.3 | 7.1 | 6.4 | 96 | 83 | 39 | 22 | 35 | 31 | 19 |
| Tea.....do.... | 54.3 | 69.2 | 71.0 | 75.5 | 76.3 | 77.6 | 77.2 | 77.6 | 27 | 31 | 39 | 41 | 43 | 42 | 43 |
| Coffee.....do.... | 29.8 | 38.0 | 41.8 | 52.1 | 51.1 | 48.8 | 48.9 | 49.6 | 28 | 40 | 75 | 71 | 64 | 64 | 66 |
| Prunes.....do.... | ..... | 19.7 | 17.5 | 17.4 | 17.1 | 15.5 | 13.6 | 14.3 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Raisins.....do.... | ..... | 18.0 | 15.6 | 14.5 | 14.6 | 14.3 | 13.6 | 11.5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Bananas.....dozen.. | ..... | 36.6 | 37.2 | 37.4 | 35.5 | 34.0 | 33.0 | 31.8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Oranges.....do.... | ..... | 50.2 | 40.2 | 51.8 | 52.6 | 48.3 | 55.2 | 39.7 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| All articles combined [1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 45.9 | 44.1 | 53.7 | 65.6 | 56.6 | 55.1 | 54.6 |

[1] Beginning with January, 1921, index numbers showing the trend in the retail cost of food have been composed of the articles shown in Tables 1 and 2, weighted according to the consumption of the average family. From January, 1913, to December, 1920, the index numbers included the following articles: Sirloin steak, round steak, rib roast, chuck roast, plate beef, pork chops, bacon, ham, lard, hens, flour, corn meal, eggs, butter, milk, bread, potatoes, sugar, cheese, rice, coffee, and tea.

Table 3 shows the trend in the retail cost of three important groups of food commodities, viz, cereals, meats, and dairy products, by years, from 1913 to 1928, and by months for 1927, 1928, and 1929. The articles within these groups are as follows:

Cereals: Bread, flour, corn meal, rice, rolled oats, corn flakes, wheat cereal, and macaroni.

Meats: Sirloin steak, round steak, rib roast, chuck roast, plate beef, pork chops, bacon, ham, hens, and leg of lamb.

Dairy products: Butter, cheese, fresh milk, and evaporated milk.

TABLE 3.—INDEX NUMBERS OF RETAIL COST OF CEREALS, MEATS, AND DAIRY PRODUCTS FOR THE UNITED STATES, 1913 TO APRIL, 1929

[Average cost in 1913=100.0]

| Year and month | Cereals | Meats | Dairy products | Year and month | Cereals | Meats | Dairy products |
|---|---|---|---|---|---|---|---|
| 1913: Average for year | 100.0 | 100.0 | 100.0 | 1927: Average for year—Continued. | | | |
| 1914: Average for year | 106.7 | 103.4 | 97.1 | October | 170.5 | 173.7 | 149.4 |
| 1915: Average for year | 121.6 | 99.6 | 96.1 | November | 169.8 | 169.9 | 150.2 |
| 1916: Average for year | 126.8 | 108.2 | 103.2 | December | 168.6 | 168.1 | 152.8 |
| 1917: Average for year | 186.5 | 137.0 | 127.6 | | | | |
| 1918: Average for year | 194.3 | 172.8 | 153.4 | | | | |
| 1919: Average for year | 198.0 | 184.2 | 176.6 | 1928: Average for year | 167.2 | 179.2 | 150.0 |
| 1920: Average for year | 232.1 | 185.7 | 185.1 | January | 168.0 | 168.3 | 152.2 |
| 1921: Average for year | 179.8 | 158.1 | 149.5 | February | 168.0 | 167.8 | 150.7 |
| 1922: Average for year | 159.3 | 150.3 | 135.9 | March | 166.8 | 167.1 | 150.7 |
| 1923: Average for year | 156.9 | 149.0 | 147.6 | April | 167.2 | 170.3 | 147.8 |
| 1924: Average for year | 160.4 | 150.2 | 142.8 | May | 168.3 | 175.4 | 147.3 |
| 1925: Average for year | 176.2 | 163.0 | 147.1 | June | 169.8 | 177.7 | 146.1 |
| 1926: Average for year | 175.5 | 171.3 | 145.5 | July | 169.3 | 184.4 | 147.1 |
| 1927: Average for year | 170.7 | 169.9 | 148.7 | August | 168.2 | 189.5 | 148.3 |
| January | 172.8 | 168.1 | 151.4 | September | 166.7 | 195.8 | 151.2 |
| February | 172.7 | 167.6 | 151.8 | October | 165.9 | 188.9 | 151.1 |
| March | 172.1 | 168.5 | 152.2 | November | 165.3 | 184.9 | 152.5 |
| April | 171.7 | 170.6 | 150.8 | December | 164.2 | 179.1 | 153.5 |
| May | 171.6 | 170.7 | 145.3 | 1929: | | | |
| June | 170.7 | 168.3 | 143.7 | January | 164.1 | 180.9 | 151.9 |
| July | 170.6 | 169.3 | 143.9 | February | 164.1 | 180.3 | 152.6 |
| August | 171.2 | 171.0 | 144.5 | March | 164.1 | 182.8 | 152.4 |
| September | 170.6 | 173.0 | 146.6 | April | 164.0 | 187.4 | 148.9 |

### Index Numbers of Retail Prices of Food in the United States

IN TABLE 4 index numbers are given which show the changes in the retail prices of specified food articles, by years, for 1913 and 1920 to 1928,[2] and by months for 1928 through April, 1929. These index numbers, or relative prices, are based on the year 1913 as 100 and are computed by dividing the average price of each commodity for each month and each year by the average price of that commodity for 1913. These figures must be used with caution. For example, the relative price of sirloin steak for the year 1928 was 188.2, which means that the average money price for the year 1928 was 88.2 per cent higher than the average money price for the year 1913. As compared with the relative price, 167.7 in 1927, the figures for 1928 show an increase of 20½ points, but an increase of 12.2 per cent in the year.

In the last column of Table 4 are given index numbers showing changes in the retail cost of all articles of food combined. Since January, 1921, these index numbers have been computed from the average prices of the articles of food shown in Tables 1 and 2, weighted according to the average family consumption in 1918. (See March,

[2] For index numbers of each month, January, 1913, to December, 1927, see Bulletin No. 396, pp. 44 to 61; Bulletin No. 418, pp. 38 to 51; Bulletin No. 445, pp. 36 to 49, and Bulletin No. 464, pp. 36 to 49.

1921, issue, p. 25.) Although previous to January, 1921, the number of food articles has varied, these index numbers have been so computed as to be strictly comparable for the entire period. The index numbers based on the average for the year 1913 as 100 are 153.0 for March, 1929, and 151.6 for April, 1929.

The curve shown in the accompanying chart pictures more readily to the eye the changes in the cost of the food budget than do the index numbers given in the table.

TREND OF RETAIL PRICES OF FOOD

[1913=100]

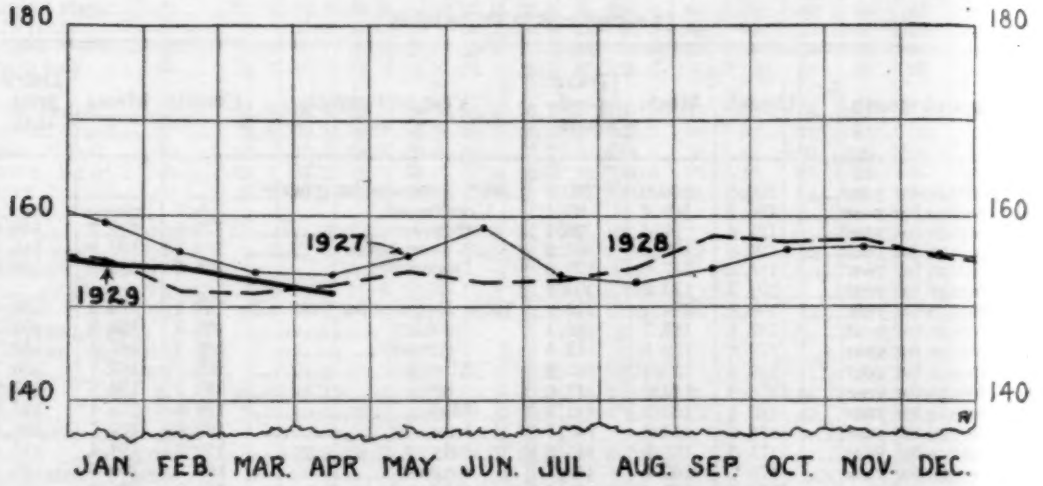



TABLE 4.—INDEX NUMBERS OF RETAIL PRICES OF PRINCIPAL ARTICLES OF FOOD, BY YEARS, 1913, 1920 TO 1928, AND BY MONTHS FOR JANUARY, 1928, THROUGH APRIL, 1929

[Average for year 1913=100.0]

| Year and month | Sirloin steak | Round steak | Rib roast | Chuck roast | Plate beef | Pork chops | Bacon | Ham | Hens | Milk | Butter | Cheese |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1920 | 172.1 | 177.1 | 167.7 | 163.8 | 151.2 | 201.4 | 193.7 | 206.3 | 209.9 | 187.6 | 183.0 | 188.2 |
| 1921 | 152.8 | 154.3 | 147.0 | 132.5 | 118.2 | 166.2 | 158.2 | 181.4 | 186.4 | 164.0 | 135.0 | 153.9 |
| 1922 | 147.2 | 144.8 | 139.4 | 123.1 | 105.8 | 157.1 | 147.4 | 181.4 | 169.0 | 147.2 | 125.1 | 148.9 |
| 1923 | 153.9 | 150.2 | 143.4 | 126.3 | 106.6 | 144.8 | 144.8 | 169.1 | 164.3 | 155.1 | 144.7 | 167.0 |
| 1924 | 155.9 | 151.6 | 145.5 | 130.0 | 109.1 | 146.7 | 139.6 | 168.4 | 165.7 | 155.1 | 135.0 | 159.7 |
| 1925 | 159.8 | 155.6 | 149.5 | 135.0 | 114.1 | 174.3 | 173.0 | 195.5 | 171.8 | 157.3 | 143.1 | 166.1 |
| 1926 | 162.6 | 159.6 | 153.0 | 140.6 | 120.7 | 188.1 | 186.3 | 213.4 | 182.2 | 157.3 | 138.6 | 165.6 |
| 1927 | 167.7 | 166.4 | 158.1 | 148.1 | 127.3 | 175.2 | 174.8 | 204.5 | 173.2 | 158.4 | 145.2 | 170.1 |
| 1928 | 188.2 | 188.3 | 176.8 | 174.4 | 157.0 | 165.7 | 163.0 | 196.7 | 175.6 | 159.6 | 147.5 | 174.2 |
| 1928: January | 174.8 | 173.1 | 165.2 | 158.8 | 142.1 | 149.0 | 165.2 | 192.2 | 172.8 | 160.7 | 150.9 | 177.4 |
| February | 176.4 | 174.4 | 167.2 | 160.6 | 144.6 | 140.5 | 161.9 | 190.3 | 174.6 | 160.7 | 147.0 | 177.4 |
| March | 176.8 | 175.3 | 167.2 | 161.3 | 146.3 | 136.2 | 159.3 | 187.7 | 174.6 | 159.6 | 149.6 | 174.2 |
| April | 178.3 | 177.6 | 168.7 | 163.1 | 147.9 | 149.0 | 158.9 | 188.1 | 177.0 | 158.4 | 143.9 | 172.9 |
| May | 181.5 | 181.2 | 172.2 | 166.3 | 150.4 | 168.6 | 159.6 | 190.3 | 177.0 | 158.4 | 142.6 | 172.4 |
| June | 186.6 | 186.5 | 175.3 | 172.5 | 152.9 | 165.7 | 160.0 | 192.2 | 174.2 | 157.3 | 140.7 | 172.4 |
| July | 195.7 | 196.9 | 181.8 | 180.6 | 157.9 | 177.6 | 162.6 | 198.5 | 172.3 | 158.4 | 141.8 | 173.3 |
| August | 200.8 | 202.2 | 184.8 | 185.0 | 162.0 | 190.0 | 165.9 | 204.5 | 172.8 | 158.4 | 144.7 | 173.8 |
| September | 203.9 | 205.4 | 188.9 | 190.0 | 170.2 | 211.0 | 168.1 | 208.2 | 177.9 | 159.6 | 150.4 | 175.1 |
| October | 198.0 | 200.0 | 185.9 | 188.8 | 171.9 | 179.0 | 167.8 | 206.7 | 177.9 | 159.6 | 150.1 | 175.6 |
| November | 193.3 | 194.6 | 183.3 | 185.6 | 171.9 | 170.0 | 164.8 | 203.0 | 178.4 | 160.7 | 152.2 | 174.2 |
| December | 189.8 | 191.5 | 180.3 | 181.9 | 168.6 | 149.0 | 160.4 | 198.5 | 177.9 | 160.7 | 154.8 | 174.2 |
| 1929: January | 190.6 | 191.0 | 180.8 | 181.3 | 170.2 | 153.8 | 159.3 | 200.0 | 184.0 | 160.7 | 150.7 | 173.8 |
| February | 188.2 | 188.8 | 178.8 | 179.4 | 167.8 | 157.1 | 158.2 | 199.6 | 186.4 | 160.7 | 152.7 | 172.9 |
| March | 188.6 | 189.2 | 179.3 | 180.0 | 167.8 | 167.6 | 158.9 | 201.9 | 190.1 | 160.7 | 152.2 | 172.9 |
| April | 192.9 | 194.6 | 183.3 | 184.4 | 170.2 | 177.1 | 160.4 | 203.3 | 196.2 | 159.6 | 145.4 | 172.4 |

TABLE 4.—INDEX NUMBERS OF RETAIL PRICES OF PRINCIPAL ARTICLES OF FOOD, BY YEARS, 1913, 1920 TO 1928, AND BY MONTHS FOR JANUARY, 1928, THROUGH APRIL, 1929—Continued

| Year and month | Lard | Eggs | Bread | Flour | Corn meal | Rice | Potatoes | Sugar | Tea | Coffee | All articles [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1920 | 186.7 | 197.4 | 205.4 | 245.5 | 216.7 | 200.0 | 370.6 | 352.7 | 134.7 | 157.7 | 203.4 |
| 1921 | 113.9 | 147.5 | 176.8 | 175.8 | 150.0 | 109.2 | 182.4 | 145.5 | 128.1 | 121.8 | 153.3 |
| 1922 | 107.6 | 128.7 | 155.4 | 154.5 | 130.0 | 109.2 | 164.7 | 132.7 | 125.2 | 121.1 | 141.6 |
| 1923 | 112.0 | 134.8 | 155.4 | 142.4 | 136.7 | 109.2 | 170.6 | 183.6 | 127.8 | 126.5 | 146.2 |
| 1924 | 120.3 | 138.6 | 157.1 | 148.5 | 156.7 | 116.1 | 158.8 | 167.3 | 131.4 | 145.3 | 145.9 |
| 1925 | 147.5 | 151.0 | 167.9 | 184.8 | 180.0 | 127.6 | 211.8 | 130.9 | 138.8 | 172.8 | 157.4 |
| 1926 | 138.6 | 140.6 | 167.9 | 181.8 | 170.0 | 133.3 | 288.2 | 125.5 | 141.0 | 171.1 | 160.6 |
| 1927 | 122.2 | 131.0 | 166.1 | 166.7 | 173.3 | 123.0 | 223.5 | 132.7 | 142.5 | 162.1 | 155.4 |
| 1928 | 117.7 | 134.5 | 162.5 | 163.6 | 176.7 | 114.9 | 158.8 | 129.1 | 142.3 | 165.1 | 154.3 |
| 1928: January | 119.6 | 162.0 | 164.3 | 160.6 | 173.3 | 117.2 | 176.5 | 129.1 | 142.3 | 162.8 | 155.1 |
| February | 115.8 | 124.9 | 164.3 | 160.6 | 173.3 | 117.2 | 176.5 | 129.1 | 142.1 | 163.1 | 151.6 |
| March | 112.7 | 107.2 | 162.5 | 160.6 | 173.3 | 116.1 | 200.0 | 129.1 | 142.3 | 163.8 | 151.4 |
| April | 112.7 | 103.8 | 162.5 | 163.6 | 176.7 | 114.9 | 205.9 | 129.1 | 141.9 | 164.1 | 152.1 |
| May | 114.6 | 108.7 | 162.5 | 169.7 | 176.7 | 114.9 | 194.1 | 130.9 | 141.9 | 164.4 | 153.8 |
| June | 115.2 | 112.5 | 164.3 | 172.7 | 176.7 | 113.8 | 170.6 | 132.7 | 142.1 | 165.1 | 152.6 |
| July | 116.5 | 120.6 | 164.3 | 169.7 | 176.7 | 114.9 | 135.3 | 132.7 | 142.3 | 165.1 | 152.8 |
| August | 118.4 | 130.4 | 164.3 | 163.6 | 176.7 | 113.8 | 129.4 | 129.1 | 142.3 | 165.8 | 154.2 |
| September | 122.2 | 146.1 | 162.5 | 160.6 | 176.7 | 114.9 | 129.4 | 127.3 | 142.3 | 166.1 | 157.8 |
| October | 123.4 | 157.4 | 162.5 | 157.6 | 176.7 | 113.8 | 129.4 | 125.5 | 142.5 | 166.4 | 156.8 |
| November | 120.9 | 171.9 | 162.5 | 154.5 | 176.7 | 112.6 | 129.4 | 123.6 | 142.3 | 166.8 | 157.3 |
| December | 118.4 | 169.3 | 160.7 | 154.5 | 176.7 | 113.8 | 129.4 | 121.8 | 142.1 | 166.8 | 155.8 |
| 1929: January | 117.1 | 146.7 | 160.7 | 154.5 | 176.7 | 112.6 | 135.3 | 121.8 | 142.6 | 166.1 | 154.6 |
| February | 116.5 | 142.3 | 160.7 | 154.5 | 176.7 | 112.6 | 135.3 | 120.0 | 142.6 | 166.1 | 154.4 |
| March | 116.5 | 122.0 | 160.7 | 154.5 | 176.7 | 112.6 | 135.3 | 118.2 | 142.8 | 166.4 | 153.0 |
| April | 117.1 | 106.7 | 160.7 | 154.5 | 176.7 | 111.5 | 135.3 | 116.4 | 142.6 | 166.4 | 151.6 |

[1] 22 articles in 1913–1920; 43 articles in 1921–1929.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929

[Exact comparisons of prices in different cities can not be made for some articles, particularly meats and vegetables, owing to differences in trade practices]

| Article | Atlanta, Ga. | | | Baltimore, Md. | | | Birmingham, Ala. | | | Boston, Mass. | | | Bridgeport, Conn. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | |
| | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak..pound.. | 44.2 | 48.3 | 49.3 | 42.7 | 44.8 | 46.6 | 43.5 | 48.6 | 49.7 | [1]71.6 | [1]73.1 | [1]73.8 | 53.5 | 53.6 | 56.5 |
| Round steak....do.... | 40.6 | 43.3 | 44.3 | 39.3 | 40.6 | 43.0 | 37.8 | 41.4 | 42.2 | 54.8 | 56.3 | 57.1 | 47.1 | 49.0 | 51.0 |
| Rib roast.....do.... | 35.0 | 34.9 | 36.1 | 33.4 | 33.6 | 34.9 | 30.6 | 34.7 | 35.4 | 42.2 | 42.8 | 43.3 | 40.5 | 40.1 | 41.6 |
| Chuck roast.....do.... | 28.6 | 28.5 | 29.9 | 25.3 | 27.5 | 29.6 | 24.6 | 28.8 | 29.2 | 30.6 | 33.2 | 34.5 | 31.3 | 33.5 | 34.2 |
| Plate beef.....do.... | 17.9 | 19.3 | 18.8 | 18.3 | 19.6 | 20.0 | 17.0 | 18.6 | 19.0 | 21.7 | 22.3 | 22.4 | 13.7 | 16.6 | 16.0 |
| Pork chops.....do.... | 31.3 | 34.0 | 35.3 | 28.6 | 33.7 | 35.7 | 28.6 | 33.2 | 34.2 | 33.8 | 37.4 | 39.1 | 32.8 | 36.8 | 40.2 |
| Bacon, sliced....do.... | 41.4 | 41.3 | 41.8 | 37.5 | 37.5 | 38.0 | 42.3 | 41.1 | 41.7 | 40.6 | 43.3 | 43.6 | 49.0 | 47.2 | 47.6 |
| Ham, sliced.....do.... | 50.8 | 56.0 | 56.0 | 50.5 | 55.0 | 55.1 | 50.3 | 53.1 | 52.8 | 54.3 | 60.1 | 59.1 | 54.6 | 55.3 | 57.7 |
| Lamb, leg of....do.... | 41.3 | 41.6 | 42.3 | 39.7 | 39.3 | 41.5 | 41.9 | 44.8 | 44.1 | 39.4 | 40.7 | 41.1 | 39.0 | 40.3 | 41.2 |
| Hens.....do.... | 35.9 | 36.7 | 37.2 | 39.7 | 41.9 | 43.8 | 32.1 | 34.8 | 35.5 | 39.8 | 42.9 | 45.9 | 40.3 | 43.4 | 45.7 |
| Salmon, canned, red ..... pound.. | 35.6 | 34.2 | 34.7 | 33.4 | 28.2 | 27.5 | 36.8 | 32.2 | 32.6 | 33.5 | 30.1 | 30.3 | 32.9 | 29.9 | 29.4 |
| Milk, fresh.....quart.. | 18.0 | 16.5 | 16.5 | 14.0 | 14.0 | 14.0 | 18.7 | 16.7 | 17.3 | 14.8 | 15.5 | 15.5 | 16.0 | 16.0 | 16.0 |
| Milk, evaporated ..... 16-ounce can.. | 13.1 | 13.8 | 13.4 | 11.1 | 11.0 | 10.7 | 11.8 | 12.2 | 12.2 | 11.5 | 11.8 | 11.8 | 11.5 | 11.4 | 11.4 |
| Butter.....pound.. | 57.6 | 59.3 | 58.8 | 60.4 | 62.3 | 59.9 | 57.8 | 59.9 | 59.0 | 57.3 | 60.4 | 58.5 | 56.9 | 59.1 | 57.5 |
| Oleomargarine (all butter substitutes) ..... pound.. | 26.1 | 29.6 | 29.7 | 27.2 | 29.1 | 28.6 | 30.9 | 31.9 | 31.8 | 28.2 | 29.3 | 29.3 | 25.5 | 25.8 | 25.8 |
| Cheese.....do.... | 35.8 | 37.2 | 36.4 | 36.3 | 36.7 | 36.3 | 36.4 | 37.8 | 36.9 | 40.7 | 41.0 | 39.4 | 42.3 | 42.7 | 43.4 |
| Lard.....do.... | 17.2 | 18.5 | 18.2 | 16.2 | 16.2 | 16.5 | 17.5 | 17.9 | 17.9 | 17.9 | 17.8 | 17.9 | 17.2 | 17.4 | 17.5 |
| Vegetable lard substitute.....pound.. | 21.8 | 22.4 | 23.1 | 23.2 | 23.1 | 23.3 | 19.7 | 21.4 | 21.2 | 25.0 | 25.5 | 25.5 | 25.5 | 25.2 | 25.4 |
| Eggs, strictly fresh .....dozen.. | 33.1 | 39.1 | 34.6 | 33.5 | 41.9 | 34.4 | 32.4 | 39.4 | 35.5 | 49.5 | 55.9 | 48.9 | 46.3 | 55.9 | 46.2 |
| Bread.....pound.. | 10.8 | 10.8 | 10.8 | 9.6 | 8.5 | 8.5 | 10.1 | 10.0 | 9.9 | 8.6 | 8.6 | 8.7 | 8.8 | 8.7 | 8.7 |
| Flour.....do.... | 6.5 | 6.6 | 6.5 | 5.0 | 4.8 | 4.7 | 6.6 | 6.5 | 6.5 | 5.8 | 5.4 | 5.4 | 5.4 | 5.1 | 5.1 |
| Corn meal.....do.... | 4.1 | 4.5 | 4.5 | 4.1 | 4.2 | 4.2 | 4.1 | 4.2 | 4.1 | 6.8 | 6.7 | 6.7 | 7.2 | 7.0 | 7.2 |
| Rolled oats.....do.... | 9.6 | 9.9 | 9.6 | 8.1 | 8.1 | 8.1 | 9.8 | 9.5 | 9.6 | 8.9 | 8.9 | 8.8 | 8.6 | 8.3 | 8.5 |
| Corn flakes ..... 8-ounce package.. | 9.7 | 9.8 | 9.8 | 8.8 | 8.7 | 8.8 | 10.1 | 9.8 | 9.8 | 9.5 | 9.4 | 9.4 | 9.5 | 9.3 | 9.3 |
| Wheat cereal ..... 28-ounce package.. | 26.6 | 26.9 | 27.0 | 24.2 | 23.9 | 24.6 | 27.3 | 27.3 | 27.3 | 24.9 | 25.1 | 25.1 | 24.7 | 24.6 | 24.2 |
| Macaroni.....pound.. | 21.3 | 21.5 | 21.8 | 19.5 | 18.8 | 19.0 | 18.3 | 18.4 | 18.2 | 21.7 | 21.2 | 21.3 | 22.3 | 22.5 | 22.4 |
| Rice.....do.... | 8.9 | 9.5 | 9.4 | 9.3 | 9.1 | 8.7 | 9.5 | 8.9 | 8.9 | 11.2 | 10.5 | 10.4 | 10.5 | 10.2 | 10.2 |
| Beans, navy....do.... | 12.4 | 16.2 | 16.0 | 11.1 | 13.8 | 13.7 | 11.4 | 14.7 | 14.8 | 11.3 | 13.7 | 13.8 | 11.2 | 13.5 | 14.5 |
| Potatoes.....do.... | 4.8 | 3.4 | 3.2 | 3.2 | 2.0 | 1.9 | 4.5 | 3.4 | 3.8 | 3.5 | 2.1 | 2.1 | 3.4 | 1.9 | 1.9 |
| Onions.....do.... | 9.6 | 9.8 | 9.4 | 7.0 | 8.8 | 8.5 | 8.5 | 9.1 | 9.0 | 7.4 | 8.5 | 8.4 | 6.8 | 8.3 | 7.6 |
| Cabbage.....do.... | 6.7 | 5.4 | 4.6 | 8.0 | 5.2 | 4.8 | 6.4 | 5.1 | 4.9 | 8.2 | 6.2 | 5.9 | 6.4 | 5.8 | 5.4 |
| Beans, baked .....No. 2 can.. | 10.6 | 11.5 | 11.7 | 10.8 | 11.0 | 11.0 | 11.2 | 11.8 | 11.7 | 12.5 | 12.7 | 12.7 | 11.5 | 11.6 | 11.9 |
| Corn, canned....do.... | 17.6 | 18.3 | 17.9 | 14.9 | 16.5 | 16.4 | 17.0 | 16.8 | 16.8 | 17.4 | 17.4 | 17.3 | 18.9 | 18.5 | 18.2 |
| Peas, canned....do.... | 19.0 | 18.5 | 18.2 | 14.6 | 15.2 | 15.4 | 19.7 | 19.4 | 19.6 | 19.5 | 20.2 | 20.1 | 21.3 | 19.9 | 19.7 |
| Tomatoes, canned .....No. 2 can.. | 10.2 | 13.3 | 13.2 | 10.5 | 11.4 | 11.4 | 10.3 | 12.8 | 13.0 | 11.8 | 13.0 | 13.2 | 13.5 | 14.6 | 14.3 |
| Sugar.....pound.. | 7.6 | 7.0 | 6.8 | 6.4 | 5.5 | 5.2 | 7.4 | 6.8 | 6.7 | 7.1 | 6.4 | 6.4 | 6.9 | 6.4 | 6.4 |
| Tea.....do.... | 106.3 | 103.6 | 105.6 | 72.7 | 72.3 | 72.6 | 99.7 | 97.4 | 95.6 | 72.4 | 75.8 | 76.4 | 61.0 | 55.6 | 57.2 |
| Coffee.....do.... | 48.8 | 52.7 | 52.7 | 44.4 | 45.5 | 45.4 | 50.3 | 52.1 | 51.5 | 53.4 | 53.7 | 53.8 | 47.3 | 47.3 | 47.5 |
| Prunes.....do.... | 14.8 | 15.5 | 16.0 | 11.5 | 12.1 | 12.2 | 15.9 | 16.7 | 16.8 | 12.8 | 13.9 | 13.7 | 14.2 | 15.2 | 15.2 |
| Raisins.....do.... | 15.0 | 13.5 | 13.5 | 13.0 | 10.6 | 10.4 | 14.4 | 13.0 | 12.8 | 12.7 | 10.5 | 10.7 | 13.8 | 12.5 | 12.5 |
| Bananas.....dozen.. | 29.4 | 26.9 | 26.9 | 24.6 | 23.1 | 23.9 | 38.2 | 36.4 | 36.3 | 47.0 | 42.0 | 42.0 | 35.0 | 32.5 | 33.3 |
| Oranges.....do.... | 49.5 | 31.2 | 31.4 | 52.4 | 33.6 | 33.6 | 55.2 | 34.2 | 31.9 | 59.0 | 43.7 | 39.4 | 59.5 | 42.4 | 46.9 |

[1] The steak for which prices are here quoted is called "sirloin" in this city, but in most of the other cities included in this report it would be known as "porterhouse" steak.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Buffalo, N. Y. | | | Butte, Mont. | | | Charleston, S. C. | | | Chicago, Ill. | | | Cincinnati, Ohio | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | |
| | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak..pound.. | 44.4 | 46.6 | 48.0 | 35.0 | 36.1 | 36.4 | 37.9 | 37.7 | 38.8 | 48.5 | 52.4 | 51.9 | 41.4 | 45.2 | 46.6 |
| Round steak....do.... | 37.5 | 40.5 | 41.4 | 33.6 | 33.6 | 34.8 | 35.9 | 35.8 | 37.7 | 38.6 | 42.9 | 43.9 | 37.3 | 42.6 | 43.5 |
| Rib roast.....do.... | 33.2 | 35.1 | 35.4 | 30.1 | 30.9 | 31.6 | 31.2 | 30.4 | 32.4 | 37.6 | 38.2 | 39.6 | 33.9 | 37.3 | 38.1 |
| Chuck roast....do.... | 26.7 | 29.2 | 29.9 | 23.8 | 25.3 | 25.7 | 23.9 | 25.6 | 27.0 | 28.5 | 32.1 | 32.5 | 24.6 | 28.0 | 28.6 |
| Plate beef.....do.... | 17.1 | 20.4 | 19.5 | 15.5 | 18.0 | 17.7 | 18.1 | 19.1 | 20.7 | 17.5 | 20.0 | 20.3 | 19.3 | 22.3 | 22.3 |
| Pork chops.....do.... | 34.6 | 39.7 | 39.2 | 29.8 | 33.6 | 35.3 | 32.6 | 35.0 | 35.5 | 31.6 | 38.8 | 37.4 | 28.9 | 34.2 | 34.5 |
| Bacon, sliced....do.... | 38.9 | 39.8 | 40.2 | 49.6 | 48.3 | 48.8 | 38.1 | 36.2 | 36.1 | 46.6 | 47.5 | 48.0 | 37.8 | 37.9 | 38.6 |
| Ham, sliced.....do.... | 48.9 | 52.5 | 53.3 | 53.8 | 54.5 | 54.2 | 44.4 | 46.8 | 47.8 | 50.9 | 53.6 | 54.0 | 49.5 | 53.3 | 53.6 |
| Lamb, leg of....do.... | 36.8 | 37.4 | 38.4 | 35.0 | 40.5 | 42.4 | 43.6 | 44.0 | 46.6 | 39.8 | 41.1 | 42.6 | 39.5 | 42.0 | 44.1 |
| Hens.....do.... | 39.8 | 41.9 | 43.5 | 35.8 | 37.7 | 37.8 | 36.9 | 38.6 | 42.7 | 39.0 | 43.7 | 44.6 | 39.9 | 43.6 | 45.6 |
| Salmon, canned, red ....pound.. | 35.3 | 29.5 | 29.4 | 33.0 | 30.8 | 32.0 | 34.8 | 27.8 | 28.3 | 36.5 | 33.0 | 33.4 | 35.9 | 29.1 | 28.9 |
| Milk, fresh.....quart.. | 13.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 19.0 | 19.0 | 19.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 |
| Milk, evaporated .....16-ounce can.. | 10.7 | 11.0 | 10.7 | 10.7 | 11.4 | 10.6 | 11.6 | 11.7 | 10.9 | 10.9 | 11.1 | 10.8 | 10.7 | 11.2 | 10.7 |
| Butter.....pound.. | 55.4 | 59.2 | 55.5 | 52.3 | 54.0 | 52.5 | 55.7 | 57.4 | 56.6 | 52.9 | 57.1 | 53.4 | 55.8 | 60.7 | 57.0 |
| Oleomargarine (all butter substitutes) ....pound.. | 27.6 | 26.3 | 26.3 | ---- | ---- | ---- | 27.6 | 29.1 | 29.0 | 26.7 | 26.6 | 26.6 | 27.6 | 28.5 | 28.3 |
| Cheese.....do.... | 39.3 | 39.2 | 39.1 | 37.7 | 37.5 | 36.5 | 35.2 | 34.7 | 34.6 | 43.5 | 41.9 | 42.1 | 39.5 | 39.3 | 39.2 |
| Lard.....do.... | 17.0 | 17.5 | 17.5 | 21.6 | 21.4 | 21.6 | 18.8 | 18.7 | 19.1 | 17.9 | 18.7 | 18.7 | 15.9 | 17.2 | 17.3 |
| Vegetable lard substitute.....pound.. | 25.6 | 25.0 | 24.7 | 30.3 | 30.7 | 30.7 | 21.3 | 21.3 | 21.3 | 26.2 | 26.0 | 25.7 | 25.7 | 25.2 | 25.4 |
| Eggs, strictly fresh ....dozen.. | 38.1 | 47.5 | 39.0 | 36.6 | 48.6 | 40.4 | 35.1 | 41.9 | 36.9 | 38.9 | 43.5 | 39.3 | 32.8 | 37.1 | 33.8 |
| Bread.....pound.. | 8.7 | 8.3 | 8.3 | 9.8 | 9.8 | 9.8 | 10.9 | 11.0 | 11.0 | 9.6 | 9.9 | 9.9 | 7.6 | 8.6 | 8.6 |
| Flour.....do.... | 4.9 | 4.6 | 4.6 | 5.5 | 4.8 | 4.9 | 6.8 | 6.4 | 6.4 | 4.9 | 4.6 | 4.6 | 5.5 | 5.3 | 5.3 |
| Corn meal.....do.... | 5.1 | 5.2 | 5.1 | 6.2 | 6.2 | 6.4 | 3.9 | 4.0 | 4.0 | 6.8 | 6.7 | 6.9 | 4.5 | 4.5 | 4.5 |
| Rolled oats.....do.... | 8.7 | 8.6 | 8.6 | 8.0 | 8.0 | 8.1 | 9.4 | 9.4 | 9.4 | 8.6 | 8.2 | 8.3 | 8.9 | 9.0 | 8.9 |
| Corn flakes ...8-ounce package.. | 9.2 | 9.1 | 9.3 | 10.5 | 10.3 | 10.0 | 9.8 | 10.0 | 10.0 | 9.3 | 9.1 | 9.2 | 9.2 | 9.6 | 9.6 |
| Wheat cereal ..28-ounce package.. | 24.8 | 24.9 | 24.9 | 28.5 | 27.9 | 27.9 | 25.6 | 25.9 | 25.6 | 25.6 | 24.8 | 24.7 | 24.8 | 24.9 | 24.9 |
| Macaroni.....pound.. | 21.4 | 21.4 | 21.5 | 19.7 | 19.9 | 19.9 | 18.5 | 18.5 | 18.6 | 18.7 | 18.7 | 18.3 | 18.2 | 18.4 | 18.1 |
| Rice.....do.... | 9.9 | 9.4 | 9.4 | 11.1 | 10.6 | 10.6 | 6.6 | 6.5 | 6.7 | 10.3 | 10.7 | 10.6 | 9.5 | 9.7 | 9.4 |
| Beans, navy.....do.... | 10.7 | 14.2 | 14.6 | 10.4 | 13.0 | 13.5 | 11.0 | 15.0 | 15.2 | 11.7 | 13.5 | 13.7 | 12.3 | 14.0 | 13.9 |
| Potatoes.....do.... | 3.4 | 1.7 | 1.4 | 2.0 | 1.7 | 1.6 | 3.7 | 2.5 | 2.6 | 3.2 | 2.4 | 2.7 | 3.6 | 2.6 | 2.5 |
| Onions.....do.... | 7.3 | 9.0 | 8.9 | 5.9 | 8.2 | 8.0 | 8.0 | 9.3 | 9.1 | 7.4 | 7.7 | 7.7 | 7.4 | 8.3 | 8.6 |
| Cabbage.....do.... | 6.7 | 6.3 | 5.4 | 6.4 | 6.8 | 6.5 | 5.6 | 5.5 | 5.6 | 7.2 | 5.9 | 5.7 | 7.2 | 5.8 | 5.2 |
| Beans, baked .....No. 2 can.. | 9.9 | 10.3 | 10.3 | 13.5 | 13.9 | 13.9 | 9.9 | 11.3 | 11.4 | 12.5 | 12.5 | 12.6 | 10.3 | 11.5 | 11.4 |
| Corn, canned....do.... | 15.9 | 16.0 | 16.1 | 14.6 | 14.8 | 14.8 | 14.8 | 14.8 | 15.0 | 16.3 | 15.9 | 15.9 | 15.7 | 15.7 | 15.7 |
| Peas, canned....do.... | 15.7 | 15.7 | 15.9 | 13.7 | 14.2 | 14.2 | 16.4 | 16.1 | 16.3 | 16.6 | 16.7 | 16.6 | 16.9 | 16.4 | 16.5 |
| Tomatoes, canned .....No. 2 can.. | 12.7 | 13.4 | 13.8 | 12.8 | 12.9 | 12.9 | 9.8 | 11.5 | 11.7 | 13.7 | 14.0 | 14.0 | 11.6 | 13.5 | 13.7 |
| Sugar.....pound.. | 6.8 | 6.1 | 6.1 | 8.5 | 7.7 | 7.6 | 6.8 | 6.1 | 6.1 | 6.9 | 6.3 | 6.3 | 7.4 | 6.7 | 6.6 |
| Tea.....do.... | 69.0 | 68.6 | 68.3 | 82.2 | 82.6 | 82.6 | 80.7 | 82.8 | 84.0 | 68.9 | 70.4 | 70.8 | 80.1 | 80.7 | 80.5 |
| Coffee.....do.... | 46.5 | 48.1 | 48.0 | 54.4 | 55.1 | 55.1 | 44.8 | 46.8 | 46.5 | 47.7 | 47.5 | 47.6 | 44.7 | 46.3 | 46.0 |
| Prunes.....do.... | 13.3 | 14.2 | 14.0 | 14.5 | 13.7 | 13.7 | 10.3 | 12.5 | 12.4 | 15.0 | 16.2 | 16.3 | 13.6 | 14.5 | 14.6 |
| Raisins.....do.... | 12.5 | 11.1 | 11.0 | 14.6 | 13.2 | 13.2 | 12.8 | 9.8 | 9.9 | 14.1 | 11.4 | 11.6 | 14.2 | 12.1 | 11.9 |
| Bananas.....dozen.. | 40.2 | 40.2 | 38.5 | [2] 8.5 | [2]12.3 | [2]12.8 | 23.5 | 22.5 | 22.8 | 40.4 | 36.7 | 37.6 | 36.1 | 35.0 | 35.5 |
| Oranges.....do.... | 57.0 | 44.8 | 47.5 | 54.0 | 41.8 | 43.8 | 49.6 | 21.9 | 27.1 | 57.4 | 44.8 | 44.7 | 53.3 | 38.2 | 38.3 |

[2] Per pound.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINICPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Cleveland, Ohio | | | Columbus, Ohio | | | Dallas, Texas | | | Denver, Colo. | | | Detroit, Mich. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak..pound.. | 43.3 | 44.9 | 48.2 | 43.5 | 46.0 | 46.3 | 41.0 | 44.5 | 46.3 | 37.0 | 38.8 | 41.1 | 46.6 | 50.0 | 51.0 |
| Round steak....do.... | 37.1 | 39.0 | 42.3 | 38.3 | 40.9 | 40.9 | 37.9 | 42.0 | 44.3 | 34.3 | 35.9 | 37.8 | 38.6 | 41.3 | 42.3 |
| Rib roast.....do.... | 31.1 | 33.5 | 34.0 | 32.9 | 36.9 | 37.4 | 32.3 | 37.0 | 38.0 | 27.9 | 29.9 | 31.1 | 34.6 | 37.8 | 37.8 |
| Chuck roast.....do.... | 27.3 | 30.1 | 30.9 | 27.5 | 30.5 | 31.2 | 27.3 | 30.1 | 31.3 | 22.5 | 26.0 | 26.6 | 26.8 | 29.4 | 30.3 |
| Plate beef.....do.... | 18.1 | 20.3 | 20.5 | 18.6 | 21.9 | 22.3 | 20.2 | 23.7 | 24.5 | 14.0 | 17.0 | 16.9 | 17.1 | 19.6 | 20.1 |
| Pork chops.....do.... | 33.0 | 38.6 | 38.1 | 28.6 | 35.5 | 35.8 | 32.7 | 35.3 | 37.0 | 29.0 | 34.4 | 35.6 | 31.9 | 38.7 | 40.2 |
| Bacon, sliced....do.... | 41.0 | 42.4 | 42.0 | 44.3 | 43.0 | 43.7 | 46.3 | 45.3 | 45.7 | 41.9 | 40.9 | 41.4 | 44.1 | 43.9 | 44.1 |
| Ham, sliced.....do.... | 52.0 | 56.7 | 55.9 | 48.6 | 53.2 | 52.7 | 53.8 | 57.0 | 57.0 | 51.2 | 54.3 | 55.3 | 53.1 | 61.1 | 60.6 |
| Lamb, leg of....do.... | 38.3 | 40.2 | 40.5 | 43.0 | 47.0 | 46.7 | 45.6 | 46.9 | 47.5 | 37.2 | 37.5 | 38.9 | 41.1 | 41.6 | 42.7 |
| Hens.....do.... | 39.9 | 42.1 | 44.3 | 39.3 | 40.8 | 43.0 | 32.5 | 34.3 | 36.0 | 32.9 | 33.7 | 35.2 | 39.6 | 43.4 | 44.6 |
| Salmon, canned, red .....pound.. | 35.5 | 31.3 | 31.2 | 37.6 | 32.2 | 31.2 | 38.4 | 33.9 | 33.2 | 38.0 | 31.0 | 31.5 | 35.7 | 30.3 | 29.8 |
| Milk, fresh.....quart.. | 13.7 | 12.0 | 12.0 | 11.0 | 12.0 | 12.0 | 12.3 | 13.0 | 13.0 | 12.0 | 12.0 | 12.0 | 14.0 | 14.0 | 14.0 |
| Milk, evaporated .....16-ounce can.. | 11.1 | 11.2 | 11.0 | 11.1 | 11.5 | 11.2 | 13.2 | 13.5 | 13.1 | 10.1 | 10.6 | 10.3 | 10.7 | 11.1 | 10.7 |
| Butter.....pound.. | 56.8 | 60.9 | 57.1 | 52.8 | 58.8 | 55.2 | 57.3 | 58.4 | 56.8 | 50.0 | 54.2 | 52.2 | 54.2 | 59.7 | 55.0 |
| Oleomargarine (all butter substitutes) .....pound.. | 28.5 | 28.7 | 28.5 | 26.8 | 27.7 | 27.7 | 28.6 | 28.6 | 28.6 | 24.4 | 24.6 | 24.4 | 25.3 | 26.1 | 25.3 |
| Cheese.....do.... | 39.7 | 40.7 | 40.8 | 36.4 | 37.4 | 36.8 | 37.4 | 38.5 | 38.3 | 39.5 | 39.4 | 39.1 | 40.0 | 38.9 | 39.3 |
| Lard.....do.... | 19.5 | 20.1 | 19.9 | 14.3 | 15.7 | 15.8 | 21.4 | 20.6 | 20.4 | 17.5 | 18.5 | 18.7 | 17.6 | 18.0 | 18.0 |
| Vegetable lard substitute.....pound.. | 26.9 | 26.4 | 26.3 | 26.2 | 25.7 | 26.9 | 23.9 | 23.9 | 23.8 | 21.2 | 21.2 | 21.4 | 26.8 | 26.1 | 26.2 |
| Eggs, strictly fresh .....dozen.. | 38.9 | 41.7 | 38.1 | 31.1 | 37.2 | 31.7 | 31.6 | 46.8 | 33.1 | 31.3 | 34.7 | 32.4 | 36.5 | 43.4 | 38.5 |
| Bread.....pound.. | 7.7 | 7.8 | 7.8 | 7.2 | 7.7 | 7.7 | 9.3 | 9.2 | 9.2 | 8.2 | 7.6 | 7.6 | 8.0 | 8.1 | 8.1 |
| Flour.....do.... | 5.4 | 5.0 | 5.0 | 4.9 | 4.8 | 4.9 | 5.6 | 5.2 | 5.2 | 4.5 | 3.8 | 3.9 | 5.1 | 4.8 | 4.8 |
| Corn meal.....do.... | 5.6 | 5.3 | 5.2 | 4.1 | 4.2 | 4.1 | 4.3 | 4.5 | 4.5 | 4.6 | 4.6 | 4.6 | 6.1 | 6.1 | 6.1 |
| Rolled oats.....do.... | 9.4 | 9.0 | 9.0 | 9.2 | 8.9 | 9.1 | 10.4 | 9.9 | 10.0 | 7.5 | 7.5 | 7.5 | 9.2 | 9.2 | 9.1 |
| Corn flakes ...8-ounce package.. | 9.9 | 9.7 | 9.7 | 10.0 | 10.2 | 10.0 | 10.3 | 9.7 | 9.7 | 9.7 | 9.8 | 9.8 | 9.5 | 9.8 | 9.8 |
| Wheat cereal ..28-ounce package.. | 25.8 | 25.9 | 25.8 | 26.4 | 26.1 | 26.1 | 27.4 | 27.5 | 27.5 | 24.7 | 24.6 | 24.7 | 26.1 | 26.1 | 26.2 |
| Macaroni.....pound.. | 21.5 | 20.8 | 20.7 | 19.6 | 20.0 | 20.0 | 21.8 | 21.5 | 21.5 | 19.2 | 19.2 | 19.4 | 21.8 | 21.0 | 20.8 |
| Rice.....do.... | 10.4 | 10.1 | 10.1 | 11.5 | 11.0 | 10.8 | 11.3 | 11.6 | 11.4 | 8.9 | 8.9 | 9.0 | 11.2 | 11.3 | 11.2 |
| Beans, navy....do.... | 10.8 | 14.6 | 14.8 | 11.7 | 14.4 | 14.5 | 12.7 | 14.8 | 15.3 | 11.4 | 12.9 | 13.2 | 11.7 | 14.1 | 13.9 |
| Potatoes.....do.... | 3.7 | 2.3 | 2.1 | 3.3 | 1.9 | 1.7 | 4.8 | 4.1 | 4.0 | 2.9 | 1.9 | 1.9 | 2.9 | 1.5 | 1.4 |
| Onions.....do.... | 7.5 | 7.6 | 8.2 | 8.3 | 9.3 | 9.4 | 8.2 | 8.8 | 8.4 | 5.3 | 7.0 | 6.4 | 7.3 | 8.1 | 7.7 |
| Cabbage.....do.... | 6.6 | 6.4 | 5.8 | 7.3 | 6.2 | 6.2 | 5.6 | 5.6 | 5.0 | 6.5 | 4.4 | 3.9 | 7.0 | 5.7 | 5.4 |
| Beans, baked .....No. 2 can.. | 12.9 | 12.1 | 11.8 | 11.9 | 11.8 | 11.9 | 12.2 | 12.7 | 13.3 | 11.2 | 11.6 | 11.7 | 11.5 | 11.9 | 12.0 |
| Corn, canned....do.... | 16.8 | 16.2 | 16.5 | 14.5 | 13.8 | 13.8 | 18.6 | 18.1 | 18.3 | 14.0 | 14.1 | 14.1 | 15.8 | 15.3 | 15.4 |
| Peas, canned....do.... | 17.5 | 17.2 | 17.1 | 14.8 | 14.8 | 14.8 | 21.5 | 21.8 | 21.7 | 15.1 | 14.7 | 14.9 | 16.3 | 16.0 | 15.9 |
| Tomatoes, canned .....No. 2 can.. | 13.6 | 13.9 | 13.9 | 12.7 | 13.5 | 13.7 | 11.8 | 14.2 | 14.3 | 12.0 | 11.7 | 12.0 | 12.3 | 13.1 | 13.2 |
| Sugar.....pound.. | 7.6 | 7.1 | 7.1 | 7.7 | 7.1 | 7.0 | 7.8 | 7.2 | 7.0 | 7.5 | 7.1 | 6.9 | 7.3 | 6.7 | 6.7 |
| Tea.....do.... | 80.0 | 81.5 | 82.9 | 86.2 | 87.8 | 87.8 | 105.4 | 105.1 | 105.3 | 69.5 | 69.3 | 69.3 | 75.2 | 71.9 | 71.9 |
| Coffee.....do.... | 51.7 | 51.6 | 51.6 | 48.7 | 49.3 | 49.3 | 57.5 | 58.8 | 59.1 | 50.0 | 49.8 | 49.8 | 47.8 | 49.9 | 49.7 |
| Prunes.....do.... | 13.9 | 14.4 | 14.1 | 15.2 | 15.6 | 15.6 | 16.6 | 16.7 | 17.5 | 15.0 | 14.9 | 15.6 | 14.2 | 15.8 | 15.4 |
| Raisins.....do.... | 13.3 | 11.8 | 11.7 | 13.9 | 11.2 | 11.2 | 15.3 | 13.4 | 12.9 | 13.1 | 10.9 | 10.9 | 13.4 | 11.4 | 11.4 |
| Bananas .....dozen.. | [2]10.4 | [2]9.9 | [2]9.4 | 34.0 | 37.5 | 37.5 | 36.3 | 35.0 | 35.0 | [2]8.5 | [2]8.8 | [2]9.1 | 32.5 | 34.0 | 34.2 |
| Oranges.....do.... | 61.6 | 42.2 | 45.4 | 53.8 | 38.5 | 38.0 | 53.1 | 48.3 | 52.2 | 54.4 | 37.9 | 36.6 | 57.4 | 39.3 | 47.6 |

[2] Per pound.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Fall River, Mass. | | | Houston, Tex. | | | Indianapolis, Ind. | | | Jacksonville, Fla. | | | Kansas City, Mo. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak[3]...pound | 68.4 | 68.7 | 68.7 | 38.8 | 39.8 | 42.3 | 43.8 | 46.6 | 47.1 | 39.0 | 39.0 | 40.0 | 41.6 | 46.9 | 48.6 |
| Round steak...do | 52.1 | 53.7 | 54.5 | 37.5 | 38.8 | 42.3 | 41.0 | 44.1 | 44.1 | 33.6 | 34.3 | 36.0 | 36.2 | 40.9 | 42.8 |
| Rib roast...do | 36.1 | 37.5 | 38.1 | 31.0 | 31.1 | 34.1 | 31.8 | 34.5 | 35.0 | 28.5 | 31.3 | 31.5 | 28.6 | 33.4 | 33.9 |
| Chuck roast...do | 27.3 | 29.5 | 30.0 | 24.0 | 25.8 | 27.9 | 27.0 | 30.5 | 30.8 | 22.1 | 24.9 | 25.3 | 22.5 | 27.1 | 28.0 |
| Plate beef...do | 15.8 | 16.7 | 16.2 | 20.3 | 23.2 | 24.7 | 17.7 | 21.1 | 21.1 | 14.3 | 15.3 | 16.6 | 16.4 | 20.7 | 20.4 |
| Pork chops...do | 31.9 | 35.4 | 38.2 | 29.0 | 33.6 | 34.5 | 29.4 | 35.3 | 35.0 | 28.3 | 32.0 | 32.3 | 27.3 | 36.7 | 34.9 |
| Bacon, sliced...do | 42.1 | 40.0 | 40.2 | 39.3 | 40.0 | 40.0 | 41.4 | 40.3 | 41.2 | 37.0 | 35.6 | 38.1 | 41.0 | 40.7 | 40.7 |
| Ham, sliced...do | 51.4 | 52.5 | 52.8 | 46.2 | 50.0 | 50.5 | 52.1 | 53.6 | 54.1 | 45.0 | 48.0 | 50.0 | 48.8 | 52.5 | 52.2 |
| Lamb, leg of...do | 42.5 | 42.5 | 42.4 | 33.3 | 33.3 | 33.3 | 42.0 | 43.0 | 44.5 | 41.0 | 40.8 | 42.0 | 35.8 | 36.9 | 38.2 |
| Hens...do | 43.3 | 47.2 | 47.3 | 34.5 | 41.0 | 42.8 | 39.2 | 44.2 | 45.2 | 34.1 | 37.2 | 37.8 | 34.4 | 36.4 | 37.1 |
| Salmon, canned, red ...pound | 36.4 | 33.6 | 33.3 | 34.5 | 29.5 | 29.9 | 33.7 | 32.0 | 31.6 | 34.7 | 30.8 | 30.8 | 37.4 | 35.0 | 34.6 |
| Milk, fresh...quart | 14.7 | 15.0 | 15.0 | 15.6 | 15.4 | 15.0 | 12.0 | 13.0 | 12.0 | 20.3 | 20.3 | 20.3 | 13.0 | 13.0 | 13.0 |
| Milk, evaporated ...16-ounce can | 12.5 | 12.5 | 12.4 | 10.5 | 11.3 | 10.5 | 10.6 | 10.6 | 10.3 | 10.9 | 11.4 | 11.0 | 11.2 | 11.5 | 10.9 |
| Butter...pound | 56.4 | 58.9 | 56.8 | 53.7 | 58.9 | 54.6 | 54.6 | 58.8 | 56.0 | 55.8 | 58.9 | 57.9 | 54.8 | 57.9 | 54.7 |
| Oleomargarine (all butter substitutes) ...pound | 26.2 | 28.4 | 28.0 | 25.3 | 25.7 | 25.9 | 28.9 | 28.2 | 28.4 | 29.2 | 28.5 | 29.0 | 25.6 | 25.5 | 25.4 |
| Cheese...do | 42.2 | 41.8 | 41.4 | 33.5 | 33.6 | 33.3 | 39.1 | 40.5 | 41.0 | 35.7 | 34.1 | 34.1 | 37.5 | 37.5 | 37.8 |
| Lard...do | 16.6 | 17.5 | 17.6 | 19.4 | 20.8 | 20.8 | 15.5 | 16.1 | 16.1 | 18.5 | 18.7 | 19.0 | 17.7 | 18.5 | 18.3 |
| Vegetable lard substitute...pound | 26.9 | 26.7 | 26.4 | 15.8 | 16.4 | 16.7 | 26.5 | 26.7 | 26.9 | 21.4 | 21.8 | 22.6 | 26.8 | 25.9 | 25.6 |
| Eggs, strictly fresh ...dozen | 42.9 | 57.8 | 47.2 | 29.0 | 30.3 | 30.4 | 31.8 | 36.9 | 33.0 | 33.9 | 42.3 | 34.1 | 34.0 | 37.5 | 34.1 |
| Bread...pound | 8.7 | 8.5 | 8.5 | 8.6 | 8.4 | 8.4 | 7.9 | 7.9 | 7.9 | 10.0 | 10.0 | 10.0 | 9.8 | 9.5 | 9.5 |
| Flour...do | 5.7 | 5.5 | 5.5 | 5.2 | 4.9 | 4.8 | 5.4 | 5.2 | 5.1 | 6.5 | 6.1 | 6.0 | 5.1 | 4.8 | 4.7 |
| Corn meal...do | 7.0 | 6.9 | 6.9 | 4.0 | 4.1 | 4.2 | 4.0 | 4.1 | 4.1 | 4.2 | 4.1 | 4.3 | 5.2 | 5.3 | 5.3 |
| Rolled oats...do | 9.5 | 9.6 | 9.5 | 8.5 | 8.5 | 8.5 | 8.9 | 8.7 | 8.7 | 9.0 | 9.1 | 9.1 | 8.9 | 9.0 | 9.0 |
| Corn flakes ...8-ounce package | 10.2 | 10.0 | 9.7 | 8.8 | 8.8 | 9.1 | 9.4 | 9.1 | 9.5 | 9.7 | 9.7 | 9.6 | 9.9 | 9.7 | 9.6 |
| Wheat cereal ...28-ounce package | 25.3 | 25.0 | 24.5 | 25.2 | 25.6 | 25.6 | 25.9 | 25.1 | 25.3 | 24.8 | 25.2 | 25.5 | 26.8 | 27.3 | 27.2 |
| Macaroni...pound | 23.3 | 24.5 | 23.3 | 18.0 | 18.7 | 18.3 | 18.8 | 18.1 | 18.1 | 18.8 | 19.3 | 19.1 | 20.0 | 20.2 | 20.3 |
| Rice...do | 11.0 | 10.4 | 10.9 | 7.0 | 7.2 | 7.1 | 11.2 | 10.8 | 10.6 | 7.7 | 7.7 | 7.6 | 9.2 | 9.4 | 9.2 |
| Beans, navy...do | 11.5 | 13.6 | 13.7 | 11.8 | 14.5 | 14.7 | 12.3 | 14.3 | 14.3 | 11.7 | 14.2 | 14.6 | 11.4 | 14.3 | 14.4 |
| Potatoes...do | 3.5 | 1.9 | 2.2 | 4.4 | 3.6 | 3.7 | 3.2 | 2.3 | 2.3 | 4.1 | 2.6 | 2.5 | 3.0 | 2.2 | 1.9 |
| Onions...do | 8.4 | 8.4 | 8.4 | 6.6 | 8.4 | 6.7 | 8.5 | 8.6 | 8.7 | 8.2 | 9.3 | 9.1 | 9.3 | 8.8 | 8.7 |
| Cabbage...do | 8.3 | 6.5 | 5.9 | 6.0 | 3.9 | 4.1 | 7.8 | 6.4 | 5.7 | 4.3 | 4.2 | 3.8 | 7.8 | 5.3 | 4.4 |
| Beans, baked ...No. 2 can | 12.1 | 12.5 | 12.8 | 10.9 | 11.3 | 11.1 | 9.7 | 11.1 | 11.1 | 10.5 | 10.8 | 10.6 | 11.7 | 12.8 | 12.9 |
| Corn, canned...do | 17.3 | 16.9 | 16.6 | 13.5 | 14.6 | 14.4 | 13.7 | 14.7 | 14.2 | 17.5 | 17.2 | 17.2 | 14.7 | 14.9 | 14.7 |
| Peas, canned...do | 19.5 | 19.2 | 19.4 | 14.0 | 15.7 | 15.7 | 14.2 | 15.0 | 14.7 | 17.9 | 18.0 | 18.5 | 15.4 | 15.6 | 15.8 |
| Tomatoes, canned ...No. 2 can | 12.1 | 13.7 | 13.9 | 10.0 | 12.0 | 12.0 | 12.0 | 13.3 | 13.5 | 9.8 | 11.0 | 11.3 | 11.2 | 13.6 | 14.2 |
| Sugar...pound | 7.1 | 6.3 | 6.3 | 6.9 | 6.6 | 6.3 | 7.3 | 6.9 | 7.0 | 7.2 | 6.2 | 6.2 | 7.6 | 7.1 | 7.0 |
| Tea...do | 58.2 | 58.3 | 58.8 | 81.4 | 86.2 | 86.2 | 87.8 | 90.8 | 89.8 | 96.6 | 95.2 | 97.4 | 91.5 | 91.9 | 91.8 |
| Coffee...do | 49.4 | 50.7 | 50.1 | 43.0 | 45.1 | 45.0 | 47.9 | 48.2 | 47.9 | 47.8 | 49.2 | 48.7 | 51.5 | 52.2 | 52.8 |
| Prunes...do | 14.1 | 13.8 | 13.7 | 12.5 | 13.8 | 13.8 | 14.4 | 16.5 | 16.5 | 15.2 | 13.8 | 13.5 | 14.5 | 14.7 | 15.2 |
| Raisins...do | 13.1 | 11.9 | 12.2 | 12.6 | 10.3 | 10.6 | 14.8 | 13.5 | 13.3 | 14.6 | 12.0 | 11.9 | 14.5 | 12.5 | 12.4 |
| Bananas...dozen | 10.2 | 10.0 | 9.0 | 25.4 | 24.6 | 24.6 | 31.1 | 30.6 | 30.6 | 28.6 | 27.1 | 28.6 | 9.9 | 10.2 | 9.1 |
| Oranges...do | 58.8 | 35.8 | 41.0 | 42.4 | 36.3 | 38.2 | 54.1 | 42.5 | 39.1 | 46.1 | 16.1 | 16.2 | 52.9 | 41.2 | 38.1 |

[2] Per pound.

[3] The steak for which prices are here quoted is called "rump" in this city, but in most of the other cities included in this report it would be known as "porterhouse" steak.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Little Rock, Ark. | | | Los Angeles, Calif. | | | Louisville, Ky. | | | Manchester, N. H. | | | Memphis, Tenn. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak..pound.. | 40.9 | 44.0 | 45.7 | 40.9 | 45.6 | 45.8 | 39.5 | 44.2 | 44.1 | [1] 62.6 | [1] 63.2 | [1] 63.8 | 41.5 | 45.0 | 46.4 |
| Round steak....do.... | 38.1 | 41.0 | 42.6 | 33.7 | 38.3 | 38.3 | 36.5 | 40.0 | 40.0 | 47.8 | 50.6 | 51.6 | 37.2 | 41.0 | 43.1 |
| Rib roast....do.... | 31.7 | 35.6 | 37.2 | 32.3 | 35.6 | 35.8 | 29.2 | 32.4 | 33.4 | 30.7 | 33.7 | 34.3 | 29.8 | 31.9 | 33.5 |
| Chuck roast....do.... | 24.1 | 28.9 | 29.7 | 24.1 | 27.8 | 27.8 | 23.8 | 26.9 | 26.6 | 25.4 | 28.6 | 28.6 | 23.8 | 26.6 | 27.9 |
| Plate beef....do.... | 19.4 | 21.4 | 21.4 | 16.7 | 20.3 | 20.0 | 19.4 | 23.0 | 22.7 | 18.5 | 21.3 | 22.0 | 19.3 | 20.8 | 21.2 |
| Pork chops....do.... | 30.2 | 35.3 | 33.4 | 36.6 | 44.6 | 43.5 | 28.8 | 35.0 | 33.1 | 30.4 | 34.4 | 36.5 | 25.2 | 31.5 | 33.1 |
| Bacon, sliced....do.... | 43.2 | 43.3 | 44.1 | 47.8 | 50.0 | 49.3 | 43.0 | 43.3 | 43.6 | 37.1 | 35.2 | 35.8 | 36.1 | 35.2 | 34.9 |
| Ham, sliced....do.... | 48.8 | 53.2 | 52.0 | 62.4 | 68.3 | 68.6 | 47.3 | 50.4 | 48.6 | 42.0 | 45.6 | 48.5 | 47.1 | 53.1 | 54.2 |
| Lamb, leg of....do.... | 40.0 | 38.7 | 41.4 | 37.9 | 40.1 | 40.3 | 41.7 | 42.5 | 41.7 | 38.6 | 40.0 | 40.3 | 37.2 | 39.1 | 39.3 |
| Hens....do.... | 30.1 | 32.6 | 33.4 | 43.5 | 46.2 | 47.4 | 34.6 | 38.3 | 39.3 | 41.8 | 43.9 | 45.8 | 31.5 | 35.6 | 37.1 |
| Salmon, canned, red ....pound.. | 36.5 | 31.9 | 31.3 | 33.8 | 29.6 | 29.6 | 35.2 | 29.8 | 30.1 | 35.0 | 29.9 | 29.7 | 33.1 | 35.6 | 35.6 |
| Milk, fresh....quart.. | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 12.0 | 13.0 | 13.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| Milk, evaporated ....16-ounce can.. | 11.8 | 11.6 | 11.5 | 9.8 | 10.1 | 10.0 | 11.6 | 11.9 | 11.5 | 12.7 | 12.8 | 12.4 | 11.4 | 11.6 | 11.5 |
| Butter....pound.. | 55.0 | 57.5 | 55.7 | 49.1 | 54.3 | 52.0 | 57.3 | 60.8 | 59.1 | 58.1 | 59.0 | 56.3 | 56.8 | 59.0 | 56.7 |
| Oleomargarine (all butter substitutes) ....pound.. | 27.5 | 27.8 | 26.5 | 25.3 | 25.3 | 25.3 | 27.0 | 27.9 | 27.3 | 24.6 | 28.3 | 26.8 | 24.4 | 26.0 | 25.4 |
| Cheese....do.... | 36.8 | 36.3 | 37.2 | 38.8 | 38.5 | 38.3 | 37.1 | 38.0 | 37.5 | 38.4 | 39.1 | 38.6 | 34.1 | 35.2 | 34.9 |
| Lard....do.... | 20.9 | 20.8 | 20.4 | 18.3 | 20.0 | 20.5 | 16.3 | 17.8 | 18.0 | 17.4 | 17.4 | 17.6 | 14.5 | 15.9 | 16.1 |
| Vegetable lard substitute....pound.. | 20.2 | 20.6 | 21.6 | 23.5 | 25.1 | 25.2 | 26.4 | 27.1 | 26.3 | 26.3 | 26.0 | 26.1 | 21.8 | 21.4 | 22.0 |
| Eggs, strictly fresh ....dozen.. | 30.7 | 34.2 | 31.3 | 34.5 | 36.8 | 38.0 | 31.4 | 38.8 | 31.2 | 41.3 | 54.6 | 43.9 | 32.1 | 35.5 | 33.0 |
| Bread....pound.. | 9.3 | 9.7 | 9.4 | 8.9 | 8.6 | 8.6 | 9.1 | 9.3 | 9.4 | 8.6 | 8.2 | 8.1 | 9.5 | 9.3 | 9.3 |
| Flour....do.... | 6.1 | 6.0 | 5.9 | 5.4 | 4.8 | 4.8 | 6.5 | 6.0 | 5.9 | 5.6 | 4.8 | 4.9 | 6.2 | 6.0 | 6.0 |
| Corn meal....do.... | 4.0 | 4.1 | 4.0 | 5.7 | 5.7 | 5.7 | 4.2 | 4.0 | 4.0 | 5.2 | 5.3 | 5.3 | 3.9 | 3.9 | 4.0 |
| Rolled oats....do.... | 10.5 | 10.4 | 10.3 | 9.9 | 10.0 | 10.0 | 8.5 | 8.7 | 8.5 | 9.1 | 8.6 | 8.6 | 9.1 | 9.0 | 9.1 |
| Corn flakes ..8-ounce package.. | 10.2 | 9.8 | 9.8 | 9.4 | 9.5 | 9.5 | 9.1 | 9.4 | 9.4 | 9.6 | 9.1 | 9.0 | 9.7 | 9.8 | 9.7 |
| Wheat cereal ..28-ounce package.. | 27.6 | 27.1 | 27.3 | 25.0 | 25.0 | 25.0 | 26.8 | 26.6 | 26.8 | 25.8 | 25.6 | 25.6 | 25.9 | 25.8 | 25.8 |
| Macaroni....pound.. | 20.7 | 20.2 | 20.1 | 18.4 | 17.9 | 17.9 | 18.9 | 18.8 | 18.7 | 23.4 | 23.1 | 23.1 | 19.5 | 19.9 | 19.6 |
| Rice....do.... | 7.9 | 8.1 | 8.1 | 10.1 | 9.9 | 9.8 | 11.4 | 10.4 | 10.3 | 9.2 | 8.5 | 8.5 | 8.4 | 8.5 | 8.3 |
| Beans, navy....do.... | 11.0 | 13.9 | 14.5 | 11.5 | 13.3 | 13.4 | 11.5 | 14.5 | 14.7 | 11.9 | 13.8 | 13.9 | 11.1 | 14.0 | 14.2 |
| Potatoes....do.... | 4.1 | 2.9 | 2.8 | 3.7 | 2.4 | 2.6 | 3.6 | 2.5 | 3.2 | 3.2 | 1.7 | 1.6 | 3.9 | 2.8 | 3.0 |
| Onions....do.... | 8.9 | 8.8 | 9.0 | 6.9 | 7.8 | 7.4 | 7.8 | 9.0 | 8.8 | 7.1 | 8.3 | 8.5 | 7.2 | 8.0 | 7.5 |
| Cabbage....do.... | 6.8 | 5.0 | 4.5 | 4.5 | 5.1 | 4.4 | 7.2 | 5.5 | 4.8 | 6.1 | 7.1 | 6.2 | 5.7 | 4.2 | 3.8 |
| Beans, baked ....No. 2 can.. | 10.6 | 12.3 | 12.7 | 11.1 | 12.0 | 11.8 | 10.2 | 11.5 | 11.4 | 13.2 | 13.4 | 13.1 | 11.1 | 11.8 | 12.0 |
| Corn, canned....do.... | 16.3 | 15.8 | 16.2 | 16.3 | 15.9 | 15.9 | 15.3 | 15.3 | 15.1 | 16.4 | 16.7 | 16.6 | 14.9 | 14.6 | 14.6 |
| Peas, canned....do.... | 17.1 | 18.6 | 17.7 | 17.0 | 16.8 | 16.9 | 15.2 | 15.2 | 15.1 | 18.0 | 17.6 | 17.6 | 16.3 | 15.2 | 15.2 |
| Tomatoes, canned ....No. 2 can.. | 10.0 | 12.7 | 13.0 | [4] 14.8 | [4] 14.9 | [4] 15.3 | 10.3 | 13.4 | 13.4 | 12.1 | 13.6 | 14.1 | 9.6 | 11.6 | 12.0 |
| Sugar....pound.. | 7.8 | 7.1 | 7.2 | 7.0 | 6.1 | 6.2 | 7.3 | 7.0 | 6.9 | 7.2 | 6.7 | 6.6 | 7.1 | 6.7 | 6.5 |
| Tea....do.... | 105.1 | 104.9 | 104.9 | 74.8 | 74.0 | 74.3 | 89.8 | 95.0 | 92.7 | 64.5 | 64.9 | 63.6 | 98.5 | 95.6 | 95.6 |
| Coffee....do.... | 53.2 | 54.0 | 54.5 | 53.3 | 53.9 | 53.9 | 49.5 | 50.0 | 50.5 | 51.1 | 50.5 | 50.4 | 48.1 | 49.8 | 49.0 |
| Prunes....do.... | 14.3 | 15.6 | 16.4 | 12.6 | 13.5 | 13.6 | 14.1 | 15.9 | 15.3 | 12.5 | 13.3 | 13.4 | 14.1 | 14.5 | 14.7 |
| Raisins....do.... | 15.0 | 13.8 | 13.8 | 12.2 | 10.2 | 10.2 | 13.9 | 11.4 | 11.5 | 13.4 | 11.0 | 10.8 | 14.8 | 12.3 | 12.5 |
| Bananas....dozen.. | [2] 7.8 | [2] 8.3 | [2] 7.8 | [2] 8.8 | [2] 9.4 | [2] 9.0 | [2] 10.1 | [2] 9.3 | [2] 9.5 | [2] 8.8 | [2] 9.8 | [2] 9.2 | [2] 8.4 | [2] 7.3 | [2] 7.6 |
| Oranges....do.... | 54.1 | 45.3 | 50.3 | 42.9 | 40.8 | 39.3 | 52.3 | 29.7 | 31.5 | 58.8 | 36.1 | 38.2 | 56.5 | 29.5 | 31.9 |

[1] The steak for which prices are quoted is called "sirloin" in this city, but in most of the other cities included in this report it would be known as "porterhouse" steak.
[2] Per pound.
[4] No. 2½ can.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Milwaukee, Wis. | | | Minneapolis, Minn. | | | Mobile, Ala. | | | Newark, N. J. | | | New Haven, Conn. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak..pound.. | 41.0 | 43.6 | 45.1 | 38.3 | 41.9 | 43.5 | 39.0 | 42.5 | 45.0 | 50.0 | 50.8 | 53.0 | 57.6 | 60.9 | 61.4 |
| Round steak....do.... | 37.1 | 39.6 | 40.6 | 33.9 | 38.2 | 39.4 | 39.0 | 40.0 | 43.1 | 47.2 | 47.0 | 49.1 | 46.9 | 51.4 | 52.4 |
| Rib roast.....do.... | 31.0 | 32.7 | 33.5 | 30.1 | 33.3 | 34.5 | 32.0 | 32.5 | 34.4 | 38.6 | 38.5 | 40.1 | 38.8 | 41.1 | 41.5 |
| Chuck roast....do.... | 27.5 | 30.4 | 30.9 | 25.1 | 28.8 | 29.9 | 26.0 | 26.3 | 28.1 | 28.9 | 30.6 | 31.0 | 29.0 | 33.6 | 34.2 |
| Plate beef.....do.... | 17.5 | 20.1 | 20.1 | 16.1 | 19.5 | 19.5 | 20.7 | 21.0 | 22.0 | 18.6 | 18.1 | 18.5 | 17.6 | 17.8 | 18.1 |
| Pork chops.....do.... | 29.9 | 38.8 | 36.7 | 32.9 | 38.0 | 37.6 | 33.5 | 33.1 | 32.5 | 34.1 | 36.3 | 38.6 | 29.8 | 36.5 | 37.5 |
| Bacon, sliced....do.... | 41.9 | 43.0 | 43.5 | 46.3 | 46.9 | 46.0 | 42.1 | 37.7 | 39.0 | 43.2 | 43.0 | 43.0 | 43.6 | 45.3 | 44.6 |
| Ham, sliced.....do.... | 46.0 | 48.9 | 49.1 | 46.8 | 52.9 | 53.1 | 47.7 | 48.9 | 50.0 | 50.9 | 56.5 | 55.6 | 56.4 | 59.4 | 59.5 |
| Lamb, leg of....do.... | 41.0 | 42.7 | 43.4 | 37.5 | 38.4 | 39.8 | 40.0 | 43.8 | 45.0 | 40.6 | 40.3 | 41.5 | 39.9 | 41.1 | 41.5 |
| Hens.....do.... | 36.2 | 39.6 | 42.5 | 36.3 | 38.8 | 40.0 | 33.7 | 33.8 | 37.0 | 37.7 | 41.6 | 44.4 | 41.1 | 43.5 | 45.5 |
| Salmon, canned, red ..pound.. | 34.4 | 36.7 | 36.9 | 37.7 | 35.0 | 35.2 | 36.3 | 29.0 | 29.0 | 33.6 | 29.4 | 28.8 | 34.3 | 31.2 | 31.8 |
| Milk, fresh.....quart.. | 11.0 | 11.0 | 11.0 | 12.0 | 12.0 | 12.0 | 18.0 | 18.0 | 18.0 | 15.0 | 16.0 | 16.0 | 16.0 | 16.0 | 16.0 |
| Milk, evaporated ..16-ounce can.. | 10.9 | 11.3 | 10.9 | 11.8 | 11.6 | 11.6 | 11.0 | 11.3 | 10.9 | 10.7 | 11.0 | 10.6 | 11.8 | 11.9 | 11.6 |
| Butter.....pound.. | 51.5 | 57.3 | 52.0 | 51.8 | 56.5 | 51.7 | 57.5 | 59.2 | 57.7 | 57.0 | 59.6 | 57.1 | 56.3 | 59.1 | 57.7 |
| Oleomargarine (all butter substitutes) ..pound.. | 26.3 | 26.7 | 26.8 | 25.5 | 25.6 | 25.3 | 28.9 | 29.2 | 29.2 | 29.6 | 29.8 | 28.6 | 29.6 | 28.9 | 28.4 |
| Cheese.....do.... | 36.9 | 37.4 | 37.8 | 36.6 | 36.6 | 37.3 | 36.2 | 35.6 | 35.0 | 39.2 | 41.8 | 41.8 | 40.2 | 41.4 | 42.2 |
| Lard.....do.... | 18.1 | 18.8 | 18.7 | 17.7 | 18.9 | 19.1 | 18.3 | 18.7 | 18.3 | 18.0 | 18.4 | 18.6 | 18.1 | 18.9 | 18.9 |
| Vegetable lard substitute.....pound.. | 26.4 | 26.4 | 26.5 | 27.2 | 25.9 | 26.6 | 20.6 | 20.1 | 20.1 | 25.6 | 25.5 | 25.5 | 26.0 | 25.8 | 25.8 |
| Eggs, strictly fresh ..dozen.. | 31.9 | 38.1 | 31.8 | 33.3 | 38.9 | 32.8 | 29.1 | 36.6 | 31.6 | 45.1 | 48.9 | 46.0 | 47.5 | 60.6 | 49.4 |
| Bread.....pound.. | 8.7 | 8.7 | 8.7 | 8.9 | 8.9 | 8.9 | 10.1 | 10.1 | 10.1 | 9.1 | 9.0 | 8.8 | 9.2 | 8.7 | 8.8 |
| Flour.....do.... | 4.8 | 4.4 | 4.4 | 5.0 | 4.5 | 4.4 | 6.1 | 5.9 | 5.9 | 5.1 | 4.8 | 4.8 | 5.5 | 5.1 | 5.0 |
| Corn meal.....do.... | 5.8 | 6.1 | 6.1 | 5.9 | 5.6 | 5.5 | 4.1 | 3.9 | 3.8 | 6.9 | 6.7 | 6.7 | 7.0 | 6.9 | 6.9 |
| Rolled oats.....do.... | 8.2 | 8.1 | 8.2 | 8.1 | 7.8 | 7.9 | 8.5 | 8.4 | 8.3 | 8.2 | 8.7 | 8.7 | 9.3 | 9.1 | 9.1 |
| Corn flakes ..8-ounce package.. | 9.3 | 9.2 | 9.5 | 9.8 | 9.4 | 9.4 | 9.4 | 9.3 | 9.2 | 9.1 | 8.9 | 8.9 | 9.9 | 10.1 | 9.9 |
| Wheat cereal ..28-ounce package.. | 24.6 | 24.4 | 24.7 | 25.3 | 25.4 | 25.4 | 24.4 | 24.2 | 24.2 | 24.7 | 26.2 | 26.2 | 24.7 | 24.8 | 24.8 |
| Macaroni.....pound.. | 17.6 | 17.4 | 17.8 | 18.4 | 17.3 | 17.6 | 21.1 | 20.9 | 20.9 | 21.4 | 21.5 | 21.5 | 22.4 | 21.8 | 22.0 |
| Rice.....do.... | 10.0 | 9.7 | 9.7 | 9.8 | 10.0 | 9.9 | 9.0 | 8.2 | 8.3 | 9.2 | 9.3 | 9.3 | 10.3 | 10.4 | 10.2 |
| Beans, navy....do.... | 11.9 | 14.2 | 14.0 | 12.2 | 14.4 | 14.5 | 11.2 | 13.4 | 13.7 | 12.1 | 14.4 | 14.8 | 11.0 | 14.0 | 14.1 |
| Potatoes.....do.... | 2.9 | 1.7 | 1.5 | 2.7 | 1.6 | 1.5 | 4.1 | 2.8 | 2.9 | 4.1 | 2.3 | 2.6 | 3.5 | 2.1 | 2.0 |
| Onions.....do.... | 7.8 | 8.3 | 8.6 | 6.9 | 9.1 | 9.3 | 7.9 | 8.6 | 8.1 | 7.6 | 8.4 | 8.3 | 7.2 | 8.7 | 8.9 |
| Cabbage.....do.... | 6.8 | 6.3 | 5.4 | 7.4 | 5.3 | 4.7 | 5.5 | 3.6 | 3.7 | 8.3 | 5.5 | 5.3 | 7.4 | 6.2 | 5.9 |
| Beans, baked ..No. 2 can.. | 11.1 | 11.2 | 11.5 | 12.3 | 12.8 | 12.6 | 10.4 | 10.8 | 10.8 | 10.3 | 10.8 | 10.8 | 11.4 | 12.0 | 12.2 |
| Corn, canned...do.... | 15.8 | 16.0 | 16.1 | 14.6 | 15.3 | 15.0 | 16.1 | 14.4 | 14.4 | 16.9 | 16.4 | 16.4 | 18.3 | 18.3 | 18.1 |
| Peas, canned....do.... | 15.6 | 15.8 | 16.0 | 14.6 | 16.1 | 15.6 | 15.4 | 15.2 | 15.1 | 17.8 | 17.1 | 17.1 | 19.3 | 21.4 | 21.1 |
| Tomatoes, canned ..No. 2 can.. | 13.3 | 13.5 | 13.8 | 13.0 | 13.8 | 13.8 | 10.3 | 11.4 | 11.8 | 10.4 | 11.5 | 12.0 | 13.0 | 14.6 | 14.6 |
| Sugar.....pound.. | 6.9 | 6.3 | 6.2 | 7.2 | 6.6 | 6.5 | 7.0 | 6.4 | 6.2 | 6.7 | 6.1 | 6.1 | 7.0 | 6.5 | 6.3 |
| Tea.....do.... | 70.8 | 68.3 | 69.0 | 62.0 | 69.1 | 67.9 | 78.6 | 81.9 | 79.7 | 59.8 | 58.1 | 57.8 | 59.6 | 59.9 | 59.9 |
| Coffee.....do.... | 44.1 | 45.7 | 45.1 | 52.2 | 53.5 | 54.0 | 47.9 | 48.5 | 48.7 | 48.5 | 48.8 | 48.3 | 51.7 | 51.4 | 51.4 |
| Prunes.....do.... | 13.7 | 14.5 | 14.6 | 13.9 | 15.0 | 14.8 | 13.0 | 13.0 | 12.6 | 12.4 | 14.0 | 14.0 | 13.2 | 14.7 | 14.5 |
| Raisins.....do.... | 13.7 | 12.7 | 12.3 | 14.2 | 11.8 | 11.7 | 13.4 | 10.3 | 9.7 | 13.5 | 11.0 | 11.0 | 13.9 | 12.3 | 12.6 |
| Bananas.....dozen.. | [1]9.0 | [1]9.6 | [1]9.4 | [1]11.8 | [1]10.8 | [1]10.0 | 24.5 | 25.0 | 23.0 | 38.0 | 37.5 | 37.5 | 33.5 | 33.1 | 33.3 |
| Oranges.....do.... | 53.7 | 39.8 | 43.6 | 53.6 | 35.8 | 36.7 | 54.5 | 30.7 | 29.0 | 60.2 | 44.7 | 46.1 | 57.6 | 48.8 | 48.5 |

[1] Per pound.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | New Orleans, La. | | | New York, N. Y. | | | Norfolk, Va. | | | Omaha, Nebr. | | | Peoria, Ill. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak..pound.. | 40.1 | 43.2 | 45.0 | 49.0 | 51.5 | 52.2 | 42.7 | 46.5 | 46.5 | 39.5 | 44.3 | 45.6 | 37.2 | 39.3 | 40.7 |
| Round steak....do.... | 35.9 | 38.7 | 39.8 | 46.5 | 48.5 | 49.5 | 37.8 | 40.2 | 40.4 | 37.5 | 41.5 | 43.6 | 36.2 | 37.9 | 39.7 |
| Rib roast.....do.... | 33.7 | 35.8 | 37.2 | 42.7 | 42.4 | 43.4 | 34.2 | 38.8 | 39.1 | 27.1 | 31.5 | 31.7 | 26.5 | 29.3 | 31.0 |
| Chuck roast.....do.... | 24.4 | 26.4 | 26.6 | 28.5 | 29.2 | 30.3 | 24.9 | 28.8 | 28.7 | 23.7 | 27.6 | 28.5 | 23.5 | 26.9 | 27.4 |
| Plate beef.....do.... | 20.1 | 22.6 | 22.6 | 23.8 | 24.0 | 24.5 | 17.8 | 20.6 | 20.6 | 14.5 | 19.0 | 19.1 | 16.6 | 18.8 | 19.5 |
| Pork chops.....do.... | 31.6 | 36.0 | 35.4 | 35.5 | 39.1 | 39.8 | 30.0 | 31.8 | 34.3 | 28.8 | 35.9 | 35.8 | 27.7 | 34.4 | 34.4 |
| Bacon, sliced....do.... | 41.8 | 43.4 | 42.8 | 44.4 | 44.7 | 45.0 | 42.2 | 41.0 | 41.2 | 43.8 | 42.9 | 42.9 | 43.5 | 43.3 | 43.3 |
| Ham, sliced.....do.... | 47.7 | 51.0 | 52.0 | 54.2 | 57.0 | 57.8 | 46.1 | 43.8 | 44.8 | 46.8 | 53.4 | 53.7 | 48.8 | 49.2 | 49.6 |
| Lamb, leg of....do.... | 39.8 | 41.1 | 41.1 | 38.0 | 39.2 | 40.1 | 43.0 | 42.5 | 42.5 | 37.9 | 37.7 | 40.1 | 38.1 | 41.9 | 41.9 |
| Hens.....do.... | 36.1 | 38.8 | 41.3 | 39.3 | 42.3 | 45.0 | 36.7 | 39.6 | 39.5 | 32.5 | 35.5 | 36.7 | 33.8 | 37.5 | 38.1 |
| Salmon, canned, red ..pound.. | 36.7 | 36.0 | 35.8 | 34.6 | 29.9 | 30.5 | 36.9 | 33.2 | 32.7 | 36.1 | 34.3 | 34.6 | 36.0 | 32.8 | 33.3 |
| Milk, fresh.....quart.. | 14.0 | 14.0 | 14.0 | 15.0 | 16.0 | 16.0 | 18.0 | 18.0 | 18.0 | 10.3 | 11.3 | 11.3 | 13.0 | 13.0 | 13.0 |
| Milk, evaporated ..16-ounce can.. | 10.8 | 10.9 | 10.3 | 10.3 | 10.9 | 10.5 | 11.3 | 11.4 | 11.1 | 11.3 | 11.6 | 11.4 | 11.2 | 11.4 | 11.0 |
| Butter.....pound.. | 57.4 | 59.2 | 56.9 | 55.6 | 58.9 | 55.2 | 59.1 | 60.3 | 59.9 | 50.7 | 54.7 | 52.4 | 51.1 | 55.4 | 51.8 |
| Oleomargarine (all butter substitutes) ..pound.. | 28.2 | 28.3 | 28.4 | 27.6 | 28.5 | 28.0 | 25.0 | 26.3 | 26.6 | 26.0 | 26.4 | 26.1 | 27.5 | 27.7 | 27.7 |
| Cheese.....do.... | 38.1 | 38.8 | 38.7 | 40.7 | 40.8 | 40.8 | 35.5 | 35.1 | 34.9 | 37.2 | 35.0 | 35.1 | 36.8 | 36.6 | 36.8 |
| Lard.....do.... | 17.1 | 18.5 | 18.5 | 19.0 | 19.3 | 19.7 | 17.3 | 18.2 | 18.4 | 18.9 | 19.7 | 19.6 | 17.8 | 18.3 | 18.8 |
| Vegetable lard substitute.....pound.. | 19.5 | 19.8 | 20.1 | 25.8 | 25.7 | 25.7 | 22.7 | 21.9 | 21.9 | 26.0 | 25.8 | 25.4 | 27.3 | 27.6 | 27.6 |
| Eggs, strictly fresh ..dozen.. | 33.9 | 37.4 | 34.7 | 45.4 | 52.6 | 45.9 | 33.4 | 44.4 | 37.4 | 30.4 | 34.7 | 30.1 | 30.5 | 35.7 | 31.1 |
| Bread.....pound.. | 8.8 | 8.8 | 8.8 | 8.8 | 8.6 | 8.6 | 9.9 | 9.6 | 9.4 | 9.6 | 9.8 | 9.8 | 10.0 | 10.0 | 10.0 |
| Flour.....do.... | 6.7 | 6.7 | 6.6 | 5.2 | 5.0 | 5.0 | 5.4 | 5.3 | 5.2 | 4.3 | 4.2 | 4.2 | 5.1 | 4.8 | 4.7 |
| Corn meal.....do.... | 4.1 | 4.1 | 4.2 | 6.6 | 6.8 | 6.8 | 4.6 | 4.7 | 4.7 | 4.5 | 4.6 | 4.6 | 4.8 | 4.8 | 4.9 |
| Rolled oats.....do.... | 8.5 | 8.5 | 8.5 | 8.5 | 8.6 | 8.7 | 8.6 | 8.9 | 8.8 | 9.9 | 9.8 | 9.8 | 8.7 | 8.6 | 8.6 |
| Corn flakes ...8-ounce package.. | 9.4 | 9.4 | 9.4 | 8.8 | 9.0 | 9.0 | 9.7 | 9.7 | 9.7 | 10.1 | 9.7 | 9.8 | 9.7 | 9.6 | 9.6 |
| Wheat cereal ..28-ounce package.. | 24.8 | 25.4 | 25.2 | 24.2 | 24.5 | 24.5 | 25.2 | 24.9 | 24.9 | 28.0 | 27.3 | 27.1 | 26.1 | 25.7 | 25.7 |
| Macaroni.....pound.. | 10.7 | 9.7 | 9.8 | 20.8 | 20.2 | 20.7 | 19.0 | 19.0 | 19.0 | 20.8 | 21.4 | 21.2 | 18.6 | 18.8 | 18.8 |
| Rice.....do.... | 9.1 | 8.4 | 8.6 | 10.2 | 9.7 | 9.8 | 11.1 | 10.7 | 10.7 | 10.6 | 10.1 | 9.9 | 10.7 | 9.3 | 9.3 |
| Beans, navy....do.... | 10.3 | 13.7 | 13.6 | 11.8 | 14.4 | 14.6 | 10.4 | 13.8 | 14.1 | 12.0 | 13.8 | 13.8 | 12.2 | 14.1 | 14.4 |
| Potatoes.....do.... | 4.0 | 2.9 | 3.0 | 4.4 | 2.5 | 3.0 | 4.2 | 2.8 | 2.7 | 2.9 | 2.0 | 1.9 | 3.0 | 1.9 | 1.5 |
| Onions.....do.... | 6.9 | 7.3 | 6.6 | 7.2 | 8.2 | 8.4 | 7.0 | 8.6 | 8.0 | 8.2 | 9.1 | 9.0 | 9.4 | 9.0 | 9.6 |
| Cabbage.....do.... | 4.4 | 4.1 | 3.8 | 8.6 | 6.2 | 6.5 | 6.7 | 5.9 | 5.8 | 7.3 | 5.6 | 5.0 | 6.7 | 5.8 | 5.6 |
| Beans, baked ..No. 2 can.. | 10.8 | 11.2 | 11.1 | 10.9 | 11.6 | 11.5 | 9.7 | 10.7 | 10.6 | 13.0 | 13.1 | 13.2 | 10.1 | 11.3 | 11.5 |
| Corn, canned....do.... | 15.4 | 15.7 | 15.6 | 15.2 | 15.1 | 14.9 | 14.6 | 15.2 | 15.2 | 16.1 | 15.8 | 15.7 | 15.3 | 14.6 | 14.4 |
| Peas, canned....do.... | 17.2 | 17.2 | 17.1 | 15.3 | 15.3 | 15.4 | 16.8 | 17.6 | 17.5 | 15.7 | 15.4 | 15.1 | 16.8 | 17.3 | 17.3 |
| Tomatoes, canned ..No. 2 can.. | 10.5 | 12.3 | 12.6 | 11.1 | 12.7 | 12.6 | 9.6 | 11.7 | 11.9 | 13.3 | 14.3 | 14.0 | 12.6 | 13.4 | 13.3 |
| Sugar.....pound.. | 6.5 | 6.0 | 5.8 | 6.4 | 5.7 | 5.6 | 6.9 | 6.4 | 6.4 | 7.2 | 6.7 | 6.5 | 8.0 | 7.3 | 7.4 |
| Tea.....do.... | 78.5 | 83.6 | 83.1 | 68.0 | 67.1 | 67.4 | 95.8 | 95.6 | 94.8 | 77.8 | 78.7 | 78.7 | 67.0 | 66.1 | 65.2 |
| Coffee.....do.... | 35.6 | 37.9 | 38.0 | 46.2 | 45.0 | 45.2 | 48.8 | 50.3 | 50.6 | 53.7 | 53.6 | 53.6 | 49.1 | 49.5 | 49.5 |
| Prunes.....do.... | 13.7 | 14.0 | 14.1 | 12.5 | 13.2 | 13.2 | 13.0 | 13.5 | 13.5 | 14.7 | 14.5 | 14.7 | 15.4 | 16.8 | 16.3 |
| Raisins.....do.... | 12.6 | 10.2 | 10.1 | 13.3 | 11.4 | 11.5 | 13.5 | 11.3 | 11.4 | 14.2 | 13.3 | 13.3 | 13.8 | 11.9 | 11.6 |
| Bananas.....dozen.. | 16.4 | 15.8 | 15.8 | 38.9 | 38.6 | 38.1 | 31.1 | 32.7 | 32.3 | [1] 9.6 | [1] 10.6 | [1] 9.6 | [1] 8.7 | [1] 9.7 | [1] 9.1 |
| Oranges.....do.... | 55.6 | 42.4 | 43.3 | 63.9 | 52.0 | 54.1 | 59.5 | 37.0 | 39.0 | 48.4 | 37.2 | 33.0 | 51.1 | 40.9 | 36.7 |

[1] Per pound.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 15 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Philadelphia, Pa. | | | Pittsburgh, Pa. | | | Portland, Me. | | | Portland, Oreg. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | |
| | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak ..... pound | [1] 60.4 | [1] 61.1 | [1] 64.0 | 50.0 | 53.3 | 54.6 | [1] 65.3 | [1] 69.8 | [1] 71.3 | 35.3 | 36.5 | 36.9 |
| Round steak ..... do | 46.6 | 47.5 | 49.4 | 41.9 | 44.6 | 45.6 | 49.4 | 51.6 | 51.2 | 32.9 | 35.2 | 35.8 |
| Rib roast ..... do | 40.4 | 40.0 | 42.2 | 36.8 | 39.6 | 39.6 | 33.9 | 35.8 | 36.5 | 30.5 | 29.8 | 30.6 |
| Chuck roast ..... do | 30.6 | 32.9 | 33.5 | 29.4 | 31.9 | 32.0 | 24.7 | 28.1 | 28.2 | 24.1 | 25.6 | 26.4 |
| Plate beef ..... do | 17.8 | 18.7 | 19.7 | 17.1 | 19.7 | 19.9 | 19.6 | 24.0 | 24.4 | 18.9 | 20.3 | 20.8 |
| Pork chops ..... do | 35.0 | 38.9 | 41.2 | 32.9 | 38.6 | 40.8 | 31.7 | 35.1 | 37.9 | 30.1 | 36.6 | 36.1 |
| Bacon, sliced ..... do | 40.9 | 41.4 | 42.0 | 48.2 | 46.6 | 46.7 | 40.3 | 38.8 | 39.2 | 50.3 | 50.6 | 50.5 |
| Ham, sliced ..... do | 53.1 | 58.1 | 58.0 | 56.4 | 59.7 | 58.8 | 49.5 | 54.4 | 54.6 | 53.4 | 53.8 | 55.6 |
| Lamb, leg of ..... do | 41.6 | 42.2 | 42.8 | 41.6 | 42.6 | 44.3 | 38.9 | 41.6 | 42.2 | 38.1 | 40.4 | 40.6 |
| Hens ..... do | 40.6 | 44.1 | 46.0 | 44.7 | 48.6 | 50.0 | 41.6 | 43.0 | 44.7 | 34.8 | 36.1 | 36.9 |
| Salmon, canned, red ..... do | 32.5 | 27.7 | 28.4 | 34.4 | 29.2 | 29.1 | 35.6 | 29.4 | 29.8 | 35.7 | 32.9 | 32.6 |
| Milk, fresh ..... quart | 13.0 | 13.0 | 13.0 | 13.0 | 15.0 | 14.0 | 15.0 | 15.0 | 15.0 | 12.0 | 12.0 | 12.0 |
| Milk, evaporated ..... 16-ounce can | 11.6 | 11.4 | 11.2 | 10.4 | 11.0 | 10.6 | 12.2 | 12.4 | 12.0 | 10.3 | 10.1 | 10.1 |
| Butter ..... pound | 59.7 | 62.1 | 58.5 | 56.3 | 61.0 | 57.6 | 58.5 | 61.0 | 59.3 | 51.6 | 54.9 | 53.6 |
| Oleomargarine (all butter substitutes) ..... pound | 28.5 | 28.8 | 28.4 | 28.5 | 28.0 | 28.0 | 26.6 | 27.1 | 27.1 | 25.6 | 26.3 | 26.3 |
| Cheese ..... do | 42.0 | 42.4 | 42.8 | 41.7 | 41.2 | 41.4 | 39.0 | 38.9 | 38.9 | 38.3 | 38.4 | 38.2 |
| Lard ..... do | 16.6 | 17.6 | 18.1 | 17.8 | 18.1 | 18.2 | 17.3 | 17.3 | 17.6 | 19.7 | 18.8 | 18.7 |
| Vegetable lard substitute ..... do | 25.0 | 25.2 | 25.0 | 27.1 | 27.3 | 27.1 | 26.2 | 25.8 | 25.7 | 28.5 | 28.4 | 28.3 |
| Eggs, strictly fresh ..... dozen | 39.5 | 46.0 | 38.3 | 39.0 | 45.8 | 39.8 | 40.9 | 52.2 | 44.3 | 29.6 | 32.8 | 33.0 |
| Bread ..... pound | 9.3 | 8.3 | 8.3 | 8.5 | 8.9 | 8.9 | 10.1 | 9.0 | 8.8 | 9.2 | 9.3 | 9.3 |
| Flour ..... do | 4.9 | 4.8 | 4.8 | 5.0 | 4.6 | 4.6 | 5.5 | 5.1 | 5.0 | 4.9 | 4.7 | 4.7 |
| Corn meal ..... do | 5.2 | 5.1 | 5.0 | 5.8 | 6.0 | 5.9 | 5.2 | 5.3 | 5.4 | 6.2 | 5.7 | 5.9 |
| Rolled oats ..... do | 8.6 | 8.2 | 8.2 | 9.0 | 9.2 | 9.2 | 8.0 | 7.7 | 7.7 | 10.7 | 10.1 | 10.1 |
| Corn flakes ..... 8-ounce package | 9.3 | 8.8 | 8.7 | 9.6 | 9.7 | 9.7 | 9.6 | 9.6 | 9.7 | 9.6 | 9.6 | 9.6 |
| Wheat cereal ..... 28-ounce package | 25.2 | 24.6 | 24.6 | 25.2 | 24.7 | 24.7 | 25.6 | 25.8 | 25.8 | 27.2 | 27.0 | 27.0 |
| Macaroni ..... pound | 20.6 | 20.2 | 20.4 | 22.3 | 22.6 | 22.6 | 23.3 | 22.9 | 23.4 | 18.5 | 18.5 | 18.3 |
| Rice ..... do | 10.6 | 10.3 | 10.3 | 11.1 | 11.2 | 11.0 | 11.1 | 11.3 | 11.3 | 10.2 | 10.0 | 9.9 |
| Beans, navy ..... do | 10.8 | 14.5 | 15.0 | 11.7 | 14.6 | 14.3 | 11.4 | 12.8 | 13.6 | 12.0 | 14.3 | 14.5 |
| Potatoes ..... do | 3.8 | 2.4 | 2.6 | 3.6 | 2.5 | 2.3 | 3.2 | 1.7 | 1.7 | 2.5 | 2.1 | 2.1 |
| Onions ..... do | 7.3 | 8.2 | 8.1 | 7.9 | 8.5 | 8.8 | 7.7 | 8.4 | 8.2 | 5.1 | 6.8 | 5.6 |
| Cabbage ..... do | 6.7 | 5.5 | 5.3 | 7.1 | 5.7 | 5.5 | 3.5 | 5.6 | 6.1 | 6.4 | 7.0 | 6.2 |
| Beans, baked ..... No. 2 can | 11.0 | 11.3 | 11.3 | 12.6 | 13.1 | 13.1 | 14.9 | 15.5 | 15.7 | 11.7 | 12.9 | 12.8 |
| Corn, canned ..... do | 14.7 | 15.3 | 15.1 | 16.1 | 15.8 | 15.7 | 14.6 | 14.6 | 14.4 | 18.0 | 17.7 | 17.9 |
| Peas, canned ..... do | 15.6 | 15.7 | 15.5 | 17.2 | 16.3 | 16.4 | 17.8 | 17.4 | 17.8 | 17.5 | 17.1 | 17.1 |
| Tomatoes, canned ..... do | 11.4 | 12.8 | 12.9 | 11.6 | 13.3 | 13.4 | 12.0 | 12.9 | 12.9 | [4] 16.1 | [4] 15.6 | [4] 15.7 |
| Sugar ..... pound | 6.6 | 5.7 | 5.6 | 7.4 | 6.8 | 6.7 | 7.1 | 6.2 | 6.3 | 7.0 | 6.5 | 6.5 |
| Tea ..... do | 68.3 | 70.3 | 70.2 | 81.7 | 83.4 | 83.3 | 62.2 | 62.6 | 61.5 | 80.6 | 77.8 | 77.8 |
| Coffee ..... do | 42.9 | 43.7 | 43.7 | 48.2 | 49.7 | 49.6 | 51.6 | 52.9 | 52.6 | 52.9 | 53.6 | 53.6 |
| Prunes ..... do | 12.6 | 12.6 | 12.4 | 13.5 | 14.2 | 13.8 | 11.1 | 12.0 | 13.0 | 10.8 | 14.3 | 14.0 |
| Raisins ..... do | 13.1 | 10.9 | 10.7 | 13.6 | 11.7 | 11.5 | 12.6 | 10.8 | 10.7 | 12.8 | 11.3 | 11.4 |
| Bananas ..... dozen | 30.9 | 29.6 | 29.5 | 36.1 | 36.4 | 35.0 | [2] 10.9 | [2] 11.3 | [2] 10.5 | [2] 10.6 | [2] 10.2 | [2] 10.0 |
| Oranges ..... do | 57.5 | 35.3 | 35.4 | 55.0 | 36.3 | 36.9 | 64.4 | 39.7 | 42.4 | 50.4 | 26.3 | 35.2 |

[1] The steak for which prices are here quoted is called "sirloin" in this city, but in most of the other cities included in this report it would be known as "porterhouse" steak.
[2] Per pound.
[4] No. 2½ can.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Providence, R. I. | | | Richmond, Va. | | | Rochester, N. Y. | | | St. Louis, Mo. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak, pound | [1]76.9 | [1]77.7 | [1]76.9 | 43.8 | 46.2 | 45.9 | 45.1 | 45.4 | 46.2 | 39.9 | 44.7 | 45.2 |
| Round steak, do | 52.7 | 55.4 | 55.0 | 39.1 | 41.3 | 41.8 | 37.7 | 39.1 | 40.2 | 38.9 | 43.1 | 44.0 |
| Rib roast, do | 40.8 | 42.7 | 42.5 | 34.4 | 35.4 | 36.3 | 33.5 | 34.9 | 35.0 | 32.9 | 35.9 | 36.4 |
| Chuck roast, do | 32.2 | 34.1 | 34.1 | 25.7 | 27.8 | 28.3 | 27.5 | 30.4 | 30.5 | 24.3 | 28.1 | 28.8 |
| Plate beef, do | 21.1 | 25.4 | 26.0 | 18.7 | 21.2 | 21.2 | 16.4 | 19.2 | 18.9 | 17.5 | 21.5 | 21.3 |
| Pork chops, do | 34.6 | 39.6 | 39.5 | 29.7 | 35.3 | 37.3 | 33.3 | 38.3 | 39.9 | 27.8 | 34.7 | 33.4 |
| Bacon, sliced, do | 40.5 | 40.0 | 40.5 | 40.7 | 39.1 | 39.7 | 36.4 | 37.2 | 37.4 | 39.3 | 40.2 | 41.2 |
| Ham, sliced, do | 54.3 | 55.3 | 55.4 | 45.1 | 44.7 | 45.4 | 50.8 | 52.9 | 53.6 | 49.5 | 54.7 | 54.7 |
| Lamb, leg of, do | 42.3 | 41.9 | 42.6 | 44.8 | 44.8 | 45.4 | 41.0 | 41.2 | 42.2 | 39.7 | 40.4 | 42.7 |
| Hens, do | 41.8 | 44.2 | 46.4 | 37.9 | 40.1 | 40.1 | 40.7 | 42.3 | 44.8 | 35.4 | 40.3 | 41.1 |
| Salmon, canned, red, do | 33.7 | 30.2 | 30.2 | 35.0 | 32.3 | 31.8 | 35.9 | 31.4 | 31.4 | 35.3 | 32.0 | 31.7 |
| Milk, fresh, quart | 15.7 | 15.7 | 15.7 | 14.0 | 14.0 | 14.0 | 13.5 | 13.5 | 13.5 | 13.0 | 13.0 | 13.0 |
| Milk, evaporated, 16-ounce can | 11.5 | 11.8 | 11.7 | 12.1 | 12.5 | 12.2 | 11.2 | 11.3 | 11.1 | 10.0 | 10.8 | 10.2 |
| Butter, pound | 55.9 | 58.4 | 56.9 | 59.9 | 62.8 | 62.4 | 55.1 | 58.2 | 56.9 | 56.3 | 60.3 | 57.5 |
| Oleomargarine (all butter substitutes), pound | 26.5 | 26.7 | 25.6 | 29.6 | 29.9 | 30.0 | 28.3 | 28.5 | 28.3 | 27.1 | 26.5 | 26.3 |
| Cheese, do | 38.4 | 39.3 | 39.0 | 37.2 | 37.2 | 36.7 | 39.0 | 39.8 | 39.8 | 37.0 | 37.0 | 36.8 |
| Lard, do | 17.3 | 17.4 | 17.4 | 17.2 | 17.6 | 18.1 | 16.8 | 17.2 | 17.3 | 13.7 | 15.0 | 15.0 |
| Vegetable lard substitute, do | 26.5 | 26.5 | 26.2 | 25.5 | 25.5 | 25.5 | 26.5 | 26.0 | 26.0 | 25.3 | 25.5 | 25.3 |
| Eggs, strictly fresh, dozen | 42.8 | 56.4 | 45.1 | 33.7 | 37.9 | 32.9 | 35.3 | 46.1 | 37.1 | 34.3 | 38.0 | 33.5 |
| Bread, pound | 9.0 | 9.0 | 9.0 | 9.0 | 8.9 | 8.9 | 9.1 | 8.5 | 8.5 | 9.6 | 9.3 | 9.3 |
| Flour, do | 5.6 | 5.2 | 5.2 | 5.1 | 5.1 | 5.1 | 5.3 | 5.0 | 4.9 | 5.1 | 4.8 | 4.8 |
| Corn meal, do | 5.1 | 5.1 | 5.1 | 4.8 | 5.0 | 5.0 | 6.2 | 5.9 | 5.9 | 4.3 | 4.5 | 4.5 |
| Rolled oats, do | 8.9 | 8.9 | 9.0 | 8.6 | 8.7 | 8.6 | 9.2 | 9.0 | 9.0 | 8.1 | 8.1 | 8.1 |
| Corn flakes, 8-ounce package | 9.5 | 9.5 | 9.7 | 9.8 | 9.7 | 9.7 | 9.3 | 9.2 | 9.2 | 8.9 | 9.1 | 9.2 |
| Wheat cereal, 28-ounce package | 24.6 | 24.8 | 24.8 | 26.0 | 25.9 | 25.9 | 25.1 | 25.6 | 25.6 | 24.8 | 24.4 | 24.3 |
| Macaroni, pound | 22.9 | 22.7 | 22.5 | 20.2 | 20.5 | 20.5 | 21.2 | 19.9 | 19.9 | 19.4 | 19.8 | 19.6 |
| Rice, do | 10.3 | 9.7 | 10.1 | 11.3 | 11.4 | 11.4 | 9.5 | 8.8 | 8.8 | 9.7 | 10.1 | 10.0 |
| Beans, navy, do | 12.0 | 13.8 | 13.7 | 11.2 | 14.5 | 14.5 | 12.2 | 14.2 | 14.4 | 11.2 | 14.1 | 13.8 |
| Potatoes, do | 3.4 | 1.8 | 1.8 | 4.0 | 3.3 | 2.9 | 3.1 | 1.4 | 1.2 | 3.3 | 2.5 | 2.6 |
| Onions, do | 7.4 | 8.5 | 8.0 | 7.2 | 9.3 | 9.4 | 6.7 | 7.8 | 7.6 | 7.3 | 8.2 | 7.9 |
| Cabbage, do | 8.5 | 5.9 | 5.2 | 7.3 | 6.2 | 5.0 | 5.8 | 5.5 | 5.7 | 6.7 | 5.0 | 4.5 |
| Beans, baked, No. 2 can | 10.8 | 11.4 | 11.8 | 10.1 | 11.2 | 11.2 | 10.2 | 10.8 | 10.8 | 10.3 | 10.5 | 10.6 |
| Corn, canned, do | 17.3 | 16.2 | 16.6 | 14.8 | 15.8 | 15.8 | 16.3 | 16.3 | 16.1 | 15.1 | 15.6 | 15.7 |
| Peas, canned, do | 18.5 | 17.6 | 18.2 | 18.1 | 18.1 | 17.6 | 17.7 | 17.4 | 17.4 | 15.3 | 14.7 | 14.9 |
| Tomatoes, canned, do | 13.1 | 13.6 | 13.7 | 10.5 | 11.9 | 12.4 | 14.6 | 14.8 | 14.9 | 10.8 | 12.6 | 12.8 |
| Sugar, pound | 7.0 | 5.9 | 6.0 | 7.6 | 6.4 | 6.4 | 6.6 | 5.7 | 5.9 | 7.2 | 6.6 | 6.6 |
| Tea, do | 60.0 | 60.4 | 59.8 | 90.5 | 94.8 | 94.5 | 69.0 | 69.6 | 70.1 | 74.5 | 78.1 | 78.3 |
| Coffee, do | 51.1 | 52.4 | 51.8 | 46.8 | 48.6 | 48.2 | 46.6 | 48.2 | 48.2 | 46.8 | 47.3 | 47.1 |
| Prunes, do | 13.1 | 13.4 | 13.5 | 14.4 | 15.3 | 14.9 | 13.9 | 14.1 | 14.6 | 14.6 | 14.7 | 14.7 |
| Raisins, do | 13.5 | 11.7 | 11.3 | 13.1 | 11.1 | 11.0 | 13.6 | 11.9 | 11.6 | 13.8 | 11.0 | 11.1 |
| Bananas, dozen | 34.3 | 31.1 | 30.7 | 37.7 | 35.5 | 35.0 | 36.7 | 31.0 | 28.0 | 31.5 | 30.9 | 31.0 |
| Oranges, do | 63.5 | 42.6 | 47.5 | 55.4 | 34.6 | 36.2 | 57.4 | 43.5 | 51.1 | 52.6 | 45.1 | 43.5 |

[1] The steak for which prices are here quoted is called "sirloin" in this city, but in most of the other cities included in this report it would be known as "porterhouse" steak.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | St. Paul, Minn. | | | Salt Lake City, Utah | | | San Francisco, Calif. | | | Savannah, Ga. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | | 1928 | 1929 | |
| | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 | Apr. 15 | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak, pound | 39.4 | 40.7 | 41.1 | 36.0 | 38.0 | 39.1 | 37.7 | 41.1 | 40.9 | 40.0 | 41.8 | 43.2 |
| Round steak, do | 34.2 | 36.6 | 37.1 | 33.8 | 37.5 | 38.1 | 35.6 | 39.4 | 39.4 | 33.9 | 34.4 | 38.2 |
| Rib roast, do | 32.5 | 33.7 | 34.5 | 27.2 | 31.4 | 32.8 | 33.9 | 36.8 | 37.0 | 30.6 | 32.7 | 33.8 |
| Chuck roast, do | 26.9 | 28.3 | 28.5 | 22.9 | 26.2 | 26.6 | 23.6 | 26.9 | 26.6 | 22.8 | 25.5 | 26.1 |
| Plate beef, do | 16.2 | 18.1 | 18.1 | 16.8 | 20.0 | 20.3 | 18.6 | 21.0 | 21.4 | 19.1 | 18.8 | 21.0 |
| Pork chops, do | 28.7 | 35.3 | 34.2 | 31.2 | 38.1 | 39.5 | 36.9 | 40.7 | 42.0 | 28.1 | 29.8 | 31.2 |
| Bacon, sliced, do | 42.8 | 42.1 | 43.3 | 43.7 | 44.3 | 43.8 | 54.8 | 56.0 | 56.0 | 37.8 | 37.6 | 37.5 |
| Ham, sliced, do | 43.9 | 48.3 | 49.4 | 51.5 | 55.0 | 56.2 | 58.9 | 62.9 | 63.3 | 41.5 | 43.3 | 42.9 |
| Lamb, leg of, do | 37.1 | 36.0 | 38.0 | 36.8 | 40.8 | 40.8 | 40.4 | 43.4 | 43.1 | 38.8 | 42.6 | 42.5 |
| Hens, do | 34.8 | 36.8 | 38.3 | 32.8 | 34.8 | 35.0 | 42.4 | 44.5 | 44.5 | 31.2 | 36.3 | 36.9 |
| Salmon, canned, red, do | 39.6 | 34.8 | 34.2 | 34.9 | 33.5 | 33.6 | 32.3 | 28.1 | 28.1 | 36.0 | 33.1 | 33.2 |
| Milk, fresh, quart | 12.0 | 12.0 | 12.0 | 10.0 | 10.0 | 10.0 | 14.0 | 14.0 | 14.0 | 17.0 | 17.5 | 17.5 |
| Milk, evaporated, 16-ounce can | 11.8 | 11.5 | 11.5 | 10.1 | 10 1 | 10.0 | 10.0 | 10.0 | 9.9 | 10.9 | 11.3 | 10.8 |
| Butter, pound | 50.0 | 54.7 | 50.3 | 47.9 | 47.6 | 47.0 | 50.3 | 55.7 | 52.8 | 58.4 | 59.9 | 57.4 |
| Oleomargarine (all butter substitutes), pound | 24.4 | 24.0 | 24.5 | 26.3 | 25.5 | 25.2 | 25.4 | 24.8 | 24.9 | 30.8 | 30.8 | 30.6 |
| Cheese, do | 36.6 | 35.6 | 35.5 | 30.6 | 29.5 | 29.9 | 41.0 | 39.6 | 39.3 | 35.2 | 35.6 | 35.8 |
| Lard, do | 18.0 | 18.8 | 19.0 | 20.1 | 20.0 | 20.3 | 21.9 | 22.3 | 22.3 | 16.3 | 18.9 | 18.3 |
| Vegetable lard substitute, do | 28.3 | 27.5 | 27.1 | 29.1 | 29.5 | 29.3 | 27.5 | 27.5 | 27.5 | 16.6 | 17.0 | 17.0 |
| Eggs, strictly fresh, dozen | 33.6 | 37.3 | 31.9 | 29.2 | 35.1 | 30.1 | 33.7 | 35.3 | 35.7 | 32.7 | 37.8 | 33.5 |
| Bread, pound | 9.3 | 9.3 | 9.3 | 9.8 | 9.7 | 9.7 | 9.5 | 9.3 | 9.3 | 10.6 | 10.7 | 10.7 |
| Flour, do | 5.1 | 4.7 | 4.6 | 4.3 | 3.6 | 3.6 | 5.7 | 5.2 | 5.2 | 6.7 | 6.4 | 6.5 |
| Corn meal, do | 5.3 | 5.4 | 5.3 | 5.5 | 5.9 | 5.9 | 6.9 | 7.2 | 7.2 | 3.7 | 3.5 | 3.6 |
| Rolled oats, do | 9.8 | 10.1 | 9.9 | 8.4 | 8.8 | 8.8 | 10.0 | 10.0 | 10.0 | 8.7 | 8.4 | 8.4 |
| Corn flakes, 8-ounce package | 10.2 | 10.3 | 10.3 | 10.5 | 10.1 | 10.7 | 9.7 | 9.6 | 9.6 | 9.6 | 9.6 | 9.6 |
| Wheat cereal, 28-ounce package | 26.3 | 26.0 | 26.2 | 25.1 | 25.6 | 25.5 | 25.2 | 25.2 | 25.1 | 24.3 | 24.0 | 24.0 |
| Macaroni, pound | 18.7 | 18.5 | 18.7 | 19.3 | 19.6 | 19.5 | 15.7 | 16.2 | 16.2 | 18.0 | 17.8 | 17.9 |
| Rice, do | 10.8 | 10.5 | 10.9 | 8.9 | 8.7 | 8.6 | 10.5 | 9.3 | 9.5 | 9.2 | 9.5 | 9.2 |
| Beans, navy, do | 11.7 | 14.6 | 14.6 | 10.3 | 12.3 | 12.3 | 11.3 | 13.1 | 13.3 | 10.8 | 14.2 | 14.7 |
| Potatoes, do | 2.4 | 1.4 | 1.3 | 1.8 | 1.8 | 1.8 | 3.5 | 2.8 | 2.8 | 4.3 | 2.9 | 2.8 |
| Onions, do | 6.3 | 9.3 | 8.4 | 4.3 | 7.2 | 6.8 | 5.9 | 7.0 | 6.7 | 8.3 | 9.0 | 9.0 |
| Cabbage, do | 7.4 | 5.4 | 5.0 | 6.6 | 5.4 | 5.1 | ---- | ---- | ---- | 5.7 | 4.3 | 3.7 |
| Beans, baked, No. 2 can | 13.4 | 13.9 | 13.8 | 12.1 | 12.6 | 12.3 | 13.0 | 12.7 | 12.6 | 11.3 | 10.7 | 10.7 |
| Corn, canned, do | 15.1 | 15.0 | 15.1 | 14.1 | 14.3 | 14.1 | 17.5 | 17.3 | 17.3 | 15.2 | 15.2 | 14.8 |
| Peas, canned, do | 15.5 | 14.9 | 14.9 | 15.0 | 14.8 | 14.8 | 18.3 | 17.8 | 17.8 | 16.2 | 17.0 | 16.8 |
| Tomatoes, canned, do | 13.8 | 14.5 | 14.7 | [4] 13.9 | [4] 13.6 | [4] 13.8 | [4] 14.4 | [4] 15.2 | [4] 15.3 | 9.5 | 11.2 | 11.6 |
| Sugar, pound | 7.4 | 6.9 | 6.8 | 7.8 | 6.9 | 6.8 | 6.9 | 6.1 | 6.2 | 6.9 | 5.9 | 5.9 |
| Tea, do | 66.3 | 72.3 | 72.3 | 83.9 | 85.1 | 85.5 | 71.4 | 72.3 | 71.7 | 81.9 | 80.5 | 74.2 |
| Coffee, do | 52.9 | 52.8 | 52.8 | 53.8 | 54.7 | 55.1 | 53.3 | 53.5 | 53.5 | 45.6 | 46.7 | 46.3 |
| Prunes, do | 13.9 | 14.2 | 14.5 | 12.0 | 13.3 | 13.8 | 12.0 | 12.0 | 12.1 | 12.9 | 13.5 | 13.0 |
| Raisins, do | 14.5 | 13.6 | 13.9 | 13.0 | 11.6 | 11.6 | 11.9 | 10.2 | 10.0 | 13.6 | 11.6 | 11.8 |
| Bananas, dozen | [3] 9.8 | [3] 10.9 | [3] 10.4 | [3] 12.1 | [3] 10.4 | [3] 11.8 | 31.1 | 29.7 | 29.8 | 26.7 | 24.5 | 27.5 |
| Oranges, do | 59.8 | 45.5 | 42.5 | 50.5 | 36.3 | 33.7 | 53.9 | 40.7 | 40.0 | 50.4 | 22.7 | 23.9 |

[3] Per pound.

[4] No 2½ can.

TABLE 5.—AVERAGE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN 51 CITIES, APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| Article | Scranton, Pa. | | | Seattle, Wash. | | | Springfield, Ill. | | | Washington, D. C. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | | Apr. 15, 1928 | 1929 | |
| | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 | | Mar. 15 | Apr. 15 |
| | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. | Cts. |
| Sirloin steak, pound | 54.8 | 60.4 | 60.7 | 40.4 | 41.3 | 42.9 | 40.3 | 42.7 | 42.7 | 49.2 | 53.7 | 55.0 |
| Round steak, do | 46.6 | 49.7 | 49.7 | 35.0 | 38.0 | 39.2 | 39.8 | 42.7 | 42.7 | 42.8 | 47.1 | 49.5 |
| Rib roast, do | 38.6 | 41.3 | 41.5 | 31.4 | 34.0 | 34.8 | 26.5 | 31.3 | 31.6 | 35.6 | 38.0 | 39.4 |
| Chuck roast, do | 30.1 | 34.2 | 33.8 | 25.1 | 27.1 | 27.9 | 24.7 | 28.4 | 28.6 | 27.2 | 29.8 | 31.3 |
| Plate beef, do | 15.4 | 19.8 | 19.4 | 19.3 | 21.0 | 22.2 | 17.1 | 20.4 | 20.5 | 16.6 | 21.1 | 20.5 |
| Pork chops, do | 31.7 | 37.6 | 41.0 | 34.2 | 38.5 | 39.5 | 27.0 | 35.0 | 33.5 | 34.6 | 37.5 | 41.8 |
| Bacon, sliced, do | 43.1 | 46.9 | 47.1 | 53.4 | 53.7 | 54.8 | 42.7 | 42.5 | 42.7 | 39.0 | 40.2 | 42.9 |
| Ham, sliced, do | 53.7 | 59.5 | 59.3 | 56.7 | 58.9 | 59.1 | 46.4 | 49.5 | 50.9 | 54.1 | 57.6 | 58.7 |
| Lamb, leg of, do | 44.4 | 46.7 | 48.5 | 39.1 | 40.4 | 42.3 | 41.6 | 46.3 | 45.0 | 44.4 | 42.6 | 42.9 |
| Hens, do | 43.5 | 45.7 | 47.8 | 33.3 | 35.4 | 36.1 | 34.3 | 35.0 | 37.0 | 40.3 | 44.1 | 45.1 |
| Salmon, canned, red, do | 36.0 | 32.7 | 32.7 | 36.8 | 33.0 | 33.3 | 37.2 | 34.1 | 33.8 | 34.7 | 28.9 | 28.9 |
| Milk, fresh, quart | 13.0 | 13.0 | 13.0 | 12.0 | 12.0 | 12.0 | 14.4 | 14.4 | 14.4 | 15.0 | 14.8 | 14.8 |
| Milk, evaporated, 16-ounce can | 11.8 | 12.0 | 11.8 | 10.3 | 10.3 | 10.3 | 11.7 | 11.9 | 11.6 | 11.9 | 11.6 | 11.7 |
| Butter, pound | 56.9 | 59.6 | 57.4 | 51.5 | 55.0 | 54.2 | 55.1 | 57.6 | 53.9 | 58.8 | 61.4 | 58.4 |
| Oleomargarine (all butter substitutes), pound | 27.0 | 27.5 | 27.5 | 25.1 | 24.9 | 24.9 | 28.1 | 28.2 | 28.2 | 27.8 | 26.6 | 26.5 |
| Cheese, do | 37.5 | 38.7 | 38.1 | 36.2 | 35.5 | 35.4 | 38.3 | 36.5 | 36.5 | 40.2 | 40.5 | 41.2 |
| Lard, do | 18.5 | 19.4 | 19.5 | 20.0 | 19.8 | 20.0 | 17.6 | 18.2 | 18.2 | 16.5 | 17.0 | 16.6 |
| Vegetable lard substitute, do | 26.1 | 26.6 | 26.2 | 27.3 | 26.6 | 27.0 | 27.5 | 28.3 | 27.5 | 24.7 | 24.6 | 24.6 |
| Eggs, strictly fresh, dozen | 38.1 | 50.1 | 40.4 | 34.1 | 36.9 | 35.5 | 31.7 | 34.2 | 33.2 | 37.3 | 42.2 | 37.0 |
| Bread, pound | 10.6 | 9.8 | 9.7 | 9.6 | 9.6 | 9.6 | 10.2 | 10.1 | 10.1 | 8.9 | 8.9 | 8.9 |
| Flour, do | 5.7 | 5.4 | 5.4 | 5.0 | 4.7 | 4.7 | 5.2 | 4.6 | 4.7 | 5.7 | 5.3 | 5.3 |
| Corn meal, do | 7.5 | 7.6 | 7.7 | 5.9 | 5.9 | 5.9 | 4.8 | 4.7 | 4.7 | 5.0 | 4.9 | 4.9 |
| Rolled oats, do | 9.8 | 9.9 | 10.0 | 8.5 | 9.2 | 9.3 | 9.7 | 9.6 | 9.6 | 9.2 | 8.7 | 8.7 |
| Corn flakes, 8-ounce package | 10.1 | 10.1 | 9.9 | 9.6 | 9.6 | 9.6 | 10.0 | 9.5 | 9.5 | 9.4 | 9.2 | 9.1 |
| Wheat cereal, 28-ounce package | 25.3 | 25.5 | 25.3 | 26.7 | 26.8 | 26.8 | 27.9 | 27.5 | 27.5 | 25.0 | 24.2 | 24.2 |
| Macaroni, pound | 22.6 | 22.5 | 22.8 | 17.7 | 18.0 | 17.7 | 18.8 | 19.1 | 18.9 | 22.6 | 20.5 | 20.5 |
| Rice, do | 10.4 | 10.0 | 10.0 | 10.4 | 10.0 | 10.4 | 10.5 | 10.4 | 10.5 | 11.1 | 11.1 | 11.5 |
| Beans, navy, do | 11.2 | 13.8 | 13.5 | 12.3 | 14.3 | 14.2 | 13.5 | 14.6 | 14.3 | 11.3 | 14.2 | 14.0 |
| Potatoes, do | 3.6 | 1.8 | 2.0 | 2.3 | 1.9 | 1.9 | 3.4 | 2.0 | 1.7 | 4.1 | 2.4 | 2.3 |
| Onions, do | 8.1 | 8.4 | 8.7 | 5.8 | 7.6 | 7.1 | 7.6 | 9.4 | 9.9 | 8.7 | 8.7 | 8.3 |
| Cabbage, do | 7.2 | 7.0 | 5.9 | 6.5 | 7.2 | 6.8 | 7.2 | 6.0 | 5.5 | 7.2 | 5.3 | 4.9 |
| Beans, baked, No. 2 can | 11.2 | 12.2 | 12.2 | 11.6 | 12.8 | 12.8 | 10.7 | 11.6 | 11.4 | 10.4 | 10.8 | 10.8 |
| Corn, canned, do | 16.7 | 17.0 | 16.9 | 18.2 | 17.8 | 17.8 | 15.2 | 14.7 | 14.9 | 15.3 | 15.1 | 15.1 |
| Peas, canned, do | 17.0 | 17.7 | 17.6 | 19.0 | 17.8 | 18.1 | 16.4 | 16.1 | 15.4 | 15.4 | 14.9 | 14.9 |
| Tomatoes, canned, do | 11.9 | 13.3 | 13.6 | [4] 15.7 | [4] 15.9 | [4] 16.3 | 13.5 | 13.9 | 13.8 | 10.6 | 12.2 | 12.2 |
| Sugar, pound | 7.1 | 6.4 | 6.3 | 7.1 | 6.4 | 6.3 | 7.6 | 6.9 | 6.9 | 6.9 | 6.0 | 5.9 |
| Tea, do | 71.5 | 67.0 | 67.0 | 76.2 | 79.5 | 79.1 | 83.1 | 82.7 | 83.5 | 95.0 | 91.6 | 89.6 |
| Coffee, do | 50.4 | 50.6 | 50.5 | 51.3 | 51.7 | 52.0 | 52.2 | 51.7 | 51.7 | 47.8 | 46.9 | 47.1 |
| Prunes, do | 14.5 | 14.6 | 14.8 | 12.0 | 14.0 | 14.3 | 14.3 | 14.4 | 14.7 | 14.3 | 15.2 | 15.3 |
| Raisins, do | 13.8 | 12.1 | 11.9 | 13.1 | 10.7 | 10.7 | 14.3 | 11.9 | 11.6 | 13.6 | 12.9 | 12.8 |
| Bananas, dozen | 32.7 | 31.2 | 31.9 | [3] 9.5 | [3] 10.6 | [3] 10.5 | [3] 8.5 | [3] 8.9 | [3] 8.9 | 30.4 | 31.8 | 27.7 |
| Oranges, do | 61.5 | 46.6 | 46.4 | 53.6 | 33.0 | 33.3 | 55.9 | 38.5 | 38.0 | 60.0 | 38.8 | 40.9 |

[3] Per pound.

[4] No. 2½ can.

## Comparison of Retail Food Costs in 51 Cities

TABLE 6 shows for 39 cities the percentage of increase or decrease in the retail cost of food [3] in April, 1929, compared with the average cost in the year 1913, in April, 1928, and March, 1929. For 12 other cities comparisons are given for the 1-year and the 1-month periods; these cities have been scheduled by the bureau at different dates since 1913. The percentage changes are based on actual retail

[3] For list of articles see note 1, p. 238.

prices secured each month from retail dealers and on the average family consumption of these articles in each city.[4]

Effort has been made by the bureau each month to have all schedules for each city included in the average prices. For the month of April, 99.6 per cent of all the firms supplying retail prices in the 51 cities sent in a report promptly. The following-named 46 cities had a perfect record; that is, every merchant who is cooperating with the bureau sent in his report in time for his prices to be included in the city averages: Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Butte, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Fall River, Houston, Indianapolis, Jacksonville, Little Rock, Los Angeles, Louisville, Manchester, Memphis, Minneapolis, Mobile, Newark, New Haven, New Orleans, New York, Omaha, Peoria, Philadelphia, Pittsburgh, Portland, Me., Portland, Oreg., Providence, Richmond, Rochester, St. Louis, St. Paul, Salt Lake City, San Francisco, Savannah, Scranton, Seattle, Springfield, Ill., and Washington.

TABLE 6.—PERCENTAGE CHANGE IN THE RETAIL COST OF FOOD IN APRIL, 1929, COMPARED WITH THE COST IN MARCH, 1929, APRIL, 1928, AND WITH THE AVERAGE COST IN THE YEAR 1913, BY CITIES

| City | Percentage increase, April, 1929, compared with 1913 | Percentage decrease, April, 1929, compared with— | | City | Percentage increase, April, 1929, compared with 1913 | Percentage decrease, April, 1929, compared with— | |
|---|---|---|---|---|---|---|---|
| | | April, 1928 | March, 1929 | | | April, 1928 | March, 1929 |
| Atlanta | 56.5 | 0.1 | 0.9 | Minneapolis | 53.2 | 0.5 | 1.5 |
| Baltimore | 53.6 | 1.7 | 1.1 | Mobile | | 1.4 | 0.2 |
| Birmingham | 57.0 | *1.0 | *0.1 | Newark | 46.2 | 1.1 | 0.1 |
| Boston | 52.3 | 0.4 | 0.9 | New Haven | 52.0 | 0.8 | 1.8 |
| Bridgeport | | 1.3 | 0.8 | New Orleans | 53.0 | *1.0 | 0.5 |
| Buffalo | 54.3 | 1.5 | 2.5 | New York | 55.0 | 0.8 | 0.2 |
| Butte | | *1.2 | 1.6 | Norfolk | | 0.5 | 1.2 |
| Charleston, S. C. | 55.7 | *0.1 | *0.3 | Omaha | 47.2 | *2.0 | 1.2 |
| Chicago | 63.9 | *1.2 | 0.3 | Peoria | | 1.2 | 1.5 |
| Cincinnati | 56.5 | *1.9 | 0.9 | Philadelphia | 52.6 | 2.7 | 0.7 |
| Cleveland | 47.5 | 3.0 | 0.8 | Pittsburgh | 53.5 | *1.2 | 2.6 |
| Columbus | | *1.2 | 1.4 | Portland, Me. | | 2.0 | 1.4 |
| Dallas | 54.3 | *1.6 | 1.7 | Portland, Oreg. | 38.6 | *1.2 | 0.1 |
| Denver | 36.2 | 0.7 | 0.2 | Providence | 51.4 | 2.0 | 2.0 |
| Detroit | 57.6 | 0.3 | 1.2 | Richmond | 59.1 | *0.3 | 1.2 |
| Fall River | 49.3 | 1.2 | 1.4 | Rochester | | 2.7 | 1.6 |
| Houston | | *1.8 | 0.1 | St. Louis | 56.0 | *0.7 | 0.9 |
| Indianapolis | 49.0 | 0.0 | 2.1 | St. Paul | | 1.4 | 1.7 |
| Jacksonville | 39.8 | 1.0 | 0.9 | Salt Lake City | 30.6 | *2.0 | 0.7 |
| Kansas City | 49.2 | 0.4 | 1.8 | San Francisco | 48.9 | *0.7 | 0.5 |
| Little Rock | 47.7 | *0.7 | 0.9 | Savannah | | 0.9 | 0.6 |
| Los Angeles | 41.4 | *1.2 | 0.1 | Scranton | 57.0 | 1.6 | 1.5 |
| Louisville | 53.6 | *1.9 | 1.0 | Seattle | 44.6 | *1.9 | *0.2 |
| Manchester | 47.5 | 2.2 | 2.1 | Springfield, Ill. | | 2.1 | 1.3 |
| Memphis | 47.5 | *1.4 | *0.2 | Washington | 58.7 | 0.9 | 0.2 |
| Milwaukee | 52.8 | 0.6 | 2.0 | | | | |

* Increase.

[4] The consumption figures used from January, 1913, to December, 1920, for each article in each city are given in the Labor Review for November, 1918, pp. 94 and 95. The consumption figures which have been used for each month, beginning with January, 1921, are given in the Labor Review for March, 1927, p. 26.

## Retail Prices of Coal in the United States [a]

THE following table shows the average retail prices of coal on April 15, 1928, and March 15 and April 15, 1929, for the United States and for each of the cities from which retail food prices have been obtained. The prices quoted are for coal delivered to consumers, but do not include charges for storing the coal in cellar or coal bin where an extra handling is necessary.

In addition to the prices for Pennsylvania anthracite, prices are shown for Colorado, Arkansas, and New Mexico anthracite in those cities where these coals form any considerable portion of the sales for household use.

The prices shown for bituminous coal are averages of prices of the several kinds sold for household use.

AVERAGE RETAIL PRICES OF COAL PER TON OF 2,000 POUNDS, FOR HOUSEHOLD USE, ON APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929

| City, and kind of coal | 1928, Apr. 15 | 1929 | |
|---|---|---|---|
| | | Mar. 15 | Apr. 15 |
| United States: | | | |
| Pennsylvania anthracite— | | | |
| Stove— | | | |
| Average price | $14.95 | $15.39 | $15.04 |
| Index (1913=100) | 193.4 | 199.2 | 194.6 |
| Chestnut— | | | |
| Average price | $14.64 | $15.07 | $14.71 |
| Index (1913=100) | 185.0 | 190.4 | 185.8 |
| Bituminous— | | | |
| Average price | $8.94 | $9.06 | $8.76 |
| Index (1913=100) | 164.6 | 166.7 | 161.3 |
| Atlanta, Ga.: | | | |
| Bituminous, prepared sizes | $7.37 | $8.05 | $7.33 |
| Baltimore, Md.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | [1] 15.17 | [1] 16.00 | [1] 16.00 |
| Chestnut | [1] 14.63 | [1] 15.50 | [1] 15.50 |
| Bituminous, run of mine— | | | |
| High volatile | 8.00 | 7.93 | 7.93 |
| Birmingham, Ala.: | | | |
| Bituminous, prepared sizes | 6.94 | 7.67 | 6.85 |
| Boston, Mass.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 15.50 | 16.25 | 16.25 |
| Chestnut | 15.25 | 16.00 | 16.00 |
| Bridgeport, Conn.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 14.50 | 14.88 | 14.50 |
| Chestnut | 14.50 | 14.88 | 14.50 |
| Buffalo, N. Y.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 13.46 | 14.02 | 13.31 |
| Chestnut | 13.06 | 13.53 | 12.81 |
| Butte, Mont.: | | | |
| Bituminous, prepared sizes | 10.89 | 10.91 | 10.91 |
| Charleston, S. C.: | | | |
| Bituminous, prepared sizes | 11.00 | 9.67 | 9.67 |
| Chicago, Ill.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 16.95 | 16.90 | 16.85 |
| Chestnut | 16.46 | 16.45 | 16.45 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 8.65 | 8.20 | 8.27 |
| Low volatile | 11.85 | 11.88 | 11.85 |
| Run of mine— | | | |
| Low volatile | 8.25 | 8.25 | 8.25 |
| Cincinnati, Ohio: | | | |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 5.70 | 5.61 | 5.55 |
| Low volatile | 7.56 | 7.73 | 7.38 |
| Cleveland, Ohio: | | | |
| Pennsylvania anthracite— | | | |
| Stove | $15.05 | $15.25 | $15.10 |
| Chestnut | 14.50 | 14.87 | 14.50 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 7.49 | 7.24 | 7.04 |
| Low volatile | 9.17 | 9.94 | 9.03 |
| Columbus, Ohio: | | | |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 5.93 | 5.89 | 5.75 |
| Low volatile | 7.38 | 8.00 | 7.25 |
| Dallas, Tex.: | | | |
| Arkansas anthracite—Egg | 15.50 | 15.50 | 15.50 |
| Bituminous, prepared sizes | 12.70 | 13.08 | 13.08 |
| Denver, Colo.: | | | |
| Colorado anthracite— | | | |
| Furnace, 1 and 2 mixed | 15.60 | 16.00 | 14.25 |
| Stove, 3 and 5 mixed | 15.60 | 16.00 | 13.00 |
| Bituminous, prepared sizes | 9.29 | 10.51 | 8.96 |
| Detroit, Mich.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 16.00 | 16.00 | 16.00 |
| Chestnut | 15.50 | 15.42 | 15.50 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 8.54 | 8.27 | 8.30 |
| Low volatile | 10.06 | 10.22 | 10.31 |
| Run of mine— | | | |
| Low volatile | 7.83 | 7.75 | 8.00 |
| Fall River, Mass.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 16.00 | 16.50 | 15.75 |
| Chestnut | 15.75 | 16.25 | 15.50 |
| Houston, Tex.: | | | |
| Bituminous, prepared sizes | 11.40 | 13.20 | 12.20 |
| Indianapolis, Ind.: | | | |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 6.26 | 6.18 | 6.19 |
| Low volatile | 8.07 | 9.00 | 8.29 |
| Run of mine— | | | |
| Low volatile | 6.79 | 7.00 | 6.88 |
| Jacksonville, Fla.: | | | |
| Bituminous, prepared sizes | 14.00 | 12.00 | 12.00 |
| Kansas City, Mo.: | | | |
| Arkansas anthracite— | | | |
| Furnace | 12.50 | 12.60 | 12.60 |
| Stove No. 4 | 14.50 | 14.33 | 14.17 |
| Bituminous, prepared sizes | 7.44 | 7.30 | 7.23 |

[1] Per ton of 2,240 pounds.

[a] Prices of coal were formerly secured semiannually and published in the March and September issues of the Labor Review. Since June, 1920, these prices have been secured and published monthly.

AVERAGE RETAIL PRICES OF COAL PER TON OF 2,000 POUNDS, FOR HOUSEHOLD USE, ON APRIL 15, 1928, AND MARCH 15 AND APRIL 15, 1929—Continued

| City, and kind of coal | 1928, Apr. 15 | 1929 | |
|---|---|---|---|
| | | Mar. 15 | Apr. 15 |
| Little Rock, Ark.: | | | |
| Arkansas anthracite—Egg | $13.50 | $13.50 | $13.50 |
| Bituminous, prepared sizes | 10.15 | 10.25 | 10.20 |
| Los Angeles, Calif.: | | | |
| Bituminous, prepared sizes | 16.50 | 16.50 | 16.50 |
| Louisville, Ky.: | | | |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 5.66 | 7.05 | 5.66 |
| Low volatile | 8.00 | 9.75 | 8.00 |
| Manchester, N. H.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 16.25 | 17.25 | 16.00 |
| Chestnut | 16.00 | 17.00 | 16.00 |
| Memphis, Tenn.: | | | |
| Bituminous, prepared sizes | 8.37 | 7.39 | 7.39 |
| Milwaukee, Wis.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 15.75 | 16.30 | 16.30 |
| Chestnut | 15.45 | 15.90 | 15.90 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 8.00 | 7.80 | 7.80 |
| Low volatile | 10.38 | 11.08 | 11.08 |
| Minneapolis, Minn.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 18.15 | 18.28 | 18.28 |
| Chestnut | 17.70 | 17.90 | 17.90 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 10.98 | 10.90 | 10.90 |
| Low volatile | 13.75 | 13.50 | 13.50 |
| Mobile, Ala.: | | | |
| Bituminous, prepared sizes | 9.23 | 9.62 | 9.12 |
| Newark, N. J.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 13.60 | 14.00 | 13.40 |
| Chestnut | 13.10 | 13.50 | 12.90 |
| New Haven, Conn.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 15.20 | 14.90 | 14.90 |
| Chestnut | 15.20 | 14.90 | 14.90 |
| New Orleans, La.: | | | |
| Bituminous, prepared sizes | 10.93 | 11.21 | 9.29 |
| New York, N. Y.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 14.25 | 14.79 | 13.83 |
| Chestnut | 13.75 | 14.29 | 13.33 |
| Norfolk, Va.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 15.00 | 15.00 | 15.00 |
| Chestnut | 15.00 | 15.00 | 15.00 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 7.81 | 7.81 | 7.81 |
| Low volatile | 10.50 | 10.50 | 10.50 |
| Run of mine— | | | |
| Low volatile | 7.00 | 7.00 | 7.00 |
| Omaha, Nebr.: | | | |
| Bituminous, prepared sizes | 10.16 | 9.47 | 9.51 |
| Peoria, Ill.: | | | |
| Bituminous, prepared sizes | 6.94 | 6.83 | 6.90 |
| Philadelphia, Pa.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | [1] 13.39 | [1] 14.96 | [1] 14.00 |
| Chestnut | [1] 13.11 | [1] 14.50 | [1] 13.50 |
| Pittsburgh, Pa.: | | | |
| Pennsylvania anthracite— | | | |
| Chestnut | 14.88 | 15.00 | 15.00 |
| Bituminous, prepared sizes | 5.51 | 5.25 | 5.25 |
| Portland, Me.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | $16.56 | $16.80 | $15.84 |
| Chestnut | 16.56 | 16.80 | 15.84 |
| Portland, Oreg.: | | | |
| Bituminous, prepared sizes | 13.35 | 13.04 | 13.04 |
| Providence, R. I.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | [2] 15.50 | [2] 16.00 | [2] 15.25 |
| Chestnut | [2] 15.50 | [2] 16.00 | [2] 15.25 |
| Richmond, Va.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 14.00 | 15.00 | 15.00 |
| Chestnut | 14.00 | 15.00 | 15.00 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 7.75 | 8.13 | 8.13 |
| Low volatile | 8.92 | 9.83 | 9.83 |
| Run of mine— | | | |
| Low volatile | 6.75 | 7.50 | 7.50 |
| Rochester, N. Y.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 14.10 | 14.75 | 14.00 |
| Chestnut | 13.75 | 14.25 | 13.50 |
| St. Louis, Mo.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 16.60 | 16.80 | 16.80 |
| Chestnut | 16.25 | 16.50 | 16.50 |
| Bituminous, prepared sizes | 7.01 | 6.46 | 6.45 |
| St. Paul, Minn.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 18.15 | 18.30 | 18.30 |
| Chestnut | 17.70 | 17.90 | 17.90 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | 10.71 | 10.68 | 10.68 |
| Low volatile | 13.75 | 13.50 | 13.50 |
| Salt Lake City, Utah: | | | |
| Colorado anthracite— | | | |
| Furnace, 1 and 2 mixed | 18.00 | 18.00 | 18.00 |
| Stove, 3 and 5 mixed | 18.00 | 18.00 | 18.00 |
| Bituminous, prepared sizes | 8.49 | 7.82 | 6.94 |
| San Francisco, Calif.: | | | |
| New Mexico anthracite— | | | |
| Cerillos egg | 26.50 | 26.00 | 26.00 |
| Colorado anthracite— | | | |
| Egg | 25.75 | 25.50 | 25.50 |
| Bituminous, prepared sizes | 17.25 | 16.75 | 16.75 |
| Savannah, Ga.: | | | |
| Bituminous, prepared sizes | [3] 10.63 | [3] 10.24 | [3] 9.54 |
| Scranton, Pa.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | 10.28 | 10.53 | 10.00 |
| Chestnut | 9.92 | 10.33 | 9.63 |
| Seattle, Wash.: | | | |
| Bituminous, prepared sizes | 10.14 | 10.48 | 10.55 |
| Springfield, Ill.: | | | |
| Bituminous, prepared sizes | 4.44 | 4.24 | 4.24 |
| Washington, D. C.: | | | |
| Pennsylvania anthracite— | | | |
| Stove | [1] 14.86 | [1] 15.62 | [1] 14.93 |
| Chestnut | [1] 14.49 | [1] 15.13 | [1] 14.34 |
| Bituminous— | | | |
| Prepared sizes— | | | |
| High volatile | [1] 8.63 | [1] 8.75 | [1] 8.63 |
| Low volatile | [1] 10.50 | [1] 11.42 | [1] 11.00 |
| Run of mine— | | | |
| Mixed | [1] 7.60 | [1] 7.63 | [1] 7.81 |

[1] Per ton of 2,240 pounds.

[2] The average price of coal delivered in bin is 50 cents higher than here shown. Practically all coal is delivered in bin.

[3] All coal sold in Savannah is weighed by the city. A charge of 10 cents per ton or half ton is made. This additional charge has been included in the above price.

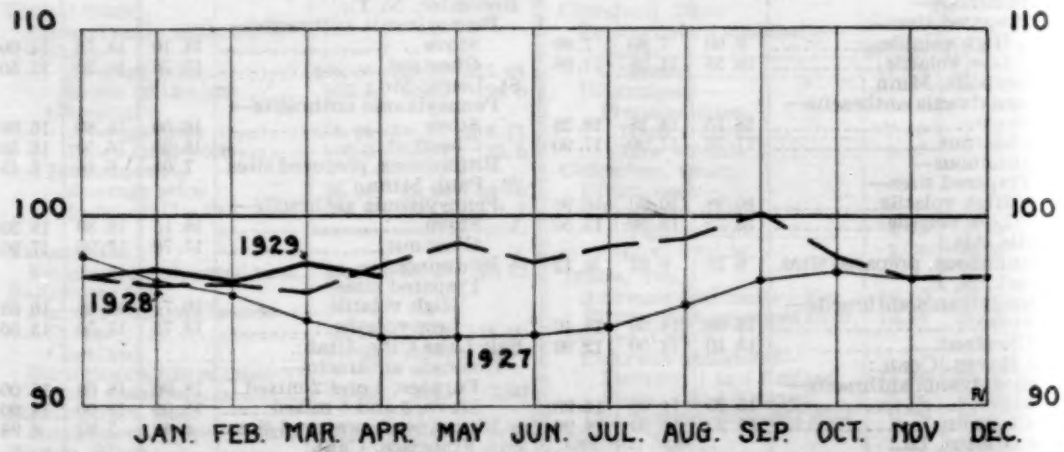
## Index Numbers of Wholesale Prices in April, 1929

A SMALL decline in the general level of wholesale prices from March to April is shown by information collected in representative markets by the Bureau of Labor Statistics of the United States Department of Labor. The bureau's weighted index number stands at 96.8 for April compared with 97.5 for March, a decrease of approximately three-fourths of 1 per cent. Compared with April, 1928, with an index number of 97.4, a decrease of a little more than one-half of 1 per cent is shown. Based on these figures, the purchasing power of the dollar in April, 1929, was 103.3 compared with 100 in the year 1926.

Farm products averaged 2 per cent lower than in the preceding month, due to pronounced price decreases for all grains, cotton, eggs, and wool. Beef cattle, hogs, and sheep and lambs, on the other hand, were higher than in March.

Among foods there were decreases for butter and flour, and increases for fresh and cured meats. The group as a whole declined nearly one-half of 1 per cent in price.

TREND OF WHOLESALE PRICES [1926=100]




Hides and skins again advanced slightly, while leather again declined, resulting in a small net decrease for the group of hides and leather products. Boots and shoes showed no change in the price level, but quotations on leather harness and suit cases were somewhat reduced.

In the group of textile products there were slight price reductions among cotton goods, woolen and worsted goods, and other textile products, the group as a whole showing a decline of over one-half of 1 per cent.

Declining prices of anthracite and bituminous coal and Connellsville coke were offset by advances in gasoline and kerosene, the price level for the fuel and lighting group remaining unchanged.

Iron and steel products advanced in price while decreases were recorded for copper, lead, and tin, no change being shown in the price level for the group of metals and metal products as a whole.

Price declines for lumber and certain paint materials caused a net decrease in the group of building materials.

Small declines were likewise shown for the groups of chemicals and drugs and miscellaneous commodities, while house-furnishing goods increased slightly.

Prices of raw materials and semimanufactured articles averaged lower than in March, while finished products were somewhat higher.

Of the 550 commodities of price series for which comparable information for March and April was collected increases were shown in 88 instances and decreases in 183 instances. In 279 instances no change in price was reported.

Comparing prices in April with those of a year ago, as measured by changes in the index numbers, it is seen that metals and metal products and building materials were appreciably higher. In all other groups prices in April were lower than a year ago, ranging from one-fourth of 1 per cent in the case of fuel and lighting materials to nearly 15 per cent in the case of hides and leather products.

INDEX NUMBERS OF WHOLESALE PRICES BY GROUPS AND SUBGROUPS OF COMMODITIES [1926=100.0]

| Groups and subgroups | April, 1928 | March, 1929 | April, 1929 | Purchasing power of the dollar, April, 1929 |
|---|---|---|---|---|
| All commodities | 97.4 | 97.5 | 96.8 | 103.3 |
| Farm products | 107.6 | 107.1 | 104.9 | 95.3 |
| Grains | 121.6 | 98.2 | 94.3 | 106.0 |
| Livestock and poultry | 102.3 | 111.0 | 114.7 | 87.2 |
| Other farm products | 106.4 | 107.5 | 101.8 | 98.2 |
| Foods | 99.5 | 98.1 | 97.7 | 102.4 |
| Butter, cheese, and milk | 101.0 | 109.2 | 106.1 | 94.3 |
| Meats | 99.2 | 108.5 | 111.5 | 89.7 |
| Other foods | 99.1 | 87.4 | 86.0 | 116.3 |
| Hides and leather products | 126.7 | 108.3 | 107.9 | 92.7 |
| Hides and skins | 167.3 | 107.9 | 108.2 | 92.4 |
| Leather | 129.8 | 112.8 | 111.3 | 89.8 |
| Boots and shoes | 110.4 | 106.6 | 106.6 | 93.8 |
| Other leather products | 108.4 | 107.3 | 105.0 | 95.2 |
| Textile products | 96.5 | 96.1 | 95.5 | 104.7 |
| Cotton goods | 100.7 | 101.3 | 100.2 | 99.8 |
| Silk and rayon | 85.5 | 81.9 | 82.4 | 121.4 |
| Woolen and worsted goods | 100.5 | 100.7 | 100.3 | 99.7 |
| Other textile products | 86.2 | 86.2 | 85.3 | 117.2 |
| Fuel and lighting | 80.8 | 80.6 | 80.6 | 124.1 |
| Anthracite coal | 90.2 | 91.4 | 88.1 | 113.5 |
| Bituminous coal | 92.2 | 92.0 | 89.3 | 112.0 |
| Coke | 82.8 | 85.2 | 84.7 | 118.1 |
| Manufactured gas | 95.2 | 92.1 | (1) | |
| Petroleum products | 69.0 | 68.5 | 71.1 | 140.6 |
| Metals and metal products | 98.4 | 106.4 | 106.4 | 94.0 |
| Iron and steel | 95.1 | 97.1 | 98.2 | 101.8 |
| Nonferrous metals | 91.3 | 117.2 | 113.1 | 88.4 |
| Agricultural implements | 98.8 | 98.8 | 98.8 | 101.2 |
| Automobiles | 104.3 | 111.6 | 112.2 | 89.1 |
| Other metal products | 96.9 | 98.4 | 98.5 | 101.5 |
| Building materials | 92.5 | 98.8 | 97.9 | 102.1 |
| Lumber | 87.8 | 96.8 | 95.4 | 104.8 |
| Brick | 92.9 | 92.2 | 92.4 | 108.2 |
| Cement | 96.5 | 94.6 | 94.6 | 105.7 |
| Structural steel | 97.0 | 97.0 | 97.0 | 103.1 |
| Paint materials | 85.0 | 86.7 | 85.2 | 117.4 |
| Other building materials | 100.2 | 110.5 | 109.6 | 91.2 |
| Chemicals and drugs | 95.8 | 95.6 | 94.9 | 105.4 |
| Chemicals | 101.1 | 101.6 | 100.5 | 99.5 |
| Drugs and pharmaceuticals | 70.6 | 71.1 | 70.7 | 141.4 |
| Fertilizer materials | 97.4 | 94.7 | 94.6 | 105.7 |
| Fertilizers | 97.0 | 96.7 | 96.2 | 104.0 |
| House-furnishing goods | 97.9 | 96.5 | 96.7 | 103.4 |
| Furniture | 97.8 | 95.0 | 95.0 | 105.3 |
| Furnishings | 97.9 | 97.4 | 97.8 | 102.2 |
| Miscellaneous | 84.9 | 80.0 | 79.2 | 126.3 |
| Cattle feed | 153.3 | 122.2 | 108.9 | 91.8 |
| Paper and pulp | 90.2 | 87.8 | 87.8 | 113.9 |
| Rubber | 41.5 | 50.6 | 44.0 | 227.3 |
| Automobile tires | 69.8 | 55.9 | 55.8 | 179.2 |
| Other miscellaneous | 98.4 | 100.2 | 103.8 | 96.3 |
| Raw materials | 100.1 | 98.9 | 97.0 | 103.1 |
| Semimanufactured articles | 97.9 | 99.1 | 97.4 | 102.7 |
| Finished products | 95.9 | 96.5 | 96.9 | 103.2 |
| Nonagricultural commodities | 94.7 | 94.9 | 94.7 | 105.6 |

[1] Data not yet available.

## Wholesale Prices in the United States and in Foreign Countries, 1923 to March, 1929

IN THE following table the more important index numbers of wholesale prices in foreign countries and those of the United States Bureau of Labor Statistics have been brought together in order that the trend of prices in thes everal countries may be compared. The base periods here shown are those appearing in the sources from which the information has been drawn, in most cases being the year 1913. Only general comparisons can be made from these figures, since, in addition to differences in the base periods, there are important differences in the composition of the index numbers themselves.

INDEX NUMBERS OF WHOLESALE PRICES IN THE UNITED STATES AND IN CERTAIN FOREIGN COUNTRIES

| Country | United States | Canada | Austria | Belgium | Czecho-slovakia | Den-mark | Finland | France | Ger-many | Italy |
|---|---|---|---|---|---|---|---|---|---|---|
| Computing agency | Bureau of Labor Statistics (revised) | Dominion Bureau of Statistics (revised) | Federal Statistical Bureau | Ministry of Industry and Labor | Central Bureau of Statistics (revised index) | Statistical Department | Central Bureau of Statistics | General Statistical Bureau | Federal Statistical Bureau | Riccardo Bachi (revised) |
| Base period | 1926 | 1926 | January–June, 1914 | April, 1914 | July, 1914 | 1913 | 1913 | 1913 | 1913 | 1913 |
| Commodities | 550 | 502 | 47 | 128 | 69 | 118 | 135 | 45 | 400 | 100 |
| *Year and month* | | | | | | | | | | |
| 1923 | 100.6 | 98.0 | 124 | 497 | 977 | ---- | ---- | 419 | ---- | [1] 503.9 |
| 1924 | 98.1 | 99.4 | 136 | 573 | 997 | ---- | 144 | 488 | 137.3 | [1] 497.4 |
| 1925 | 103.5 | 102.6 | 136 | 558 | 1008 | 210 | 147 | 550 | 141.8 | [1] 612.0 |
| 1926 | 100.0 | 100.0 | 123 | 744 | 954 | 163 | 142 | 703 | 134.4 | [1] 618.2 |
| 1927 | 95.4 | 97.7 | 133 | 847 | 979 | 153 | 145 | 617 | 137.6 | [1] 466.7 |
| 1928 | 97.7 | 96.4 | 130 | 843 | 977 | 153 | 145 | 621 | 140.0 | [1] 453.1 |
| 1923 | | | | | | | | | | |
| January | 102.0 | ---- | ---- | 434 | 991 | ---- | ---- | 387 | ---- | 516.1 |
| April | 103.9 | ---- | ---- | 480 | 1012 | ---- | ---- | 415 | ---- | 525.7 |
| July | 98.4 | ---- | ---- | 504 | 949 | ---- | ---- | 407 | ---- | 503.9 |
| October | 99.4 | ---- | ---- | 515 | 960 | ---- | ---- | 421 | ---- | 499.6 |
| 1924 | | | | | | | | | | |
| January | 99.6 | ---- | ---- | 580 | 974 | ---- | ---- | 494 | ---- | 504.4 |
| April | 97.3 | ---- | ---- | 555 | 1008 | ---- | ---- | 450 | ---- | 510.3 |
| July | 95.6 | ---- | ---- | 566 | 953 | ---- | ---- | 481 | ---- | 497.4 |
| October | 98.2 | ---- | ---- | 555 | 999 | ---- | ---- | 497 | ---- | 522.0 |
| 1925 | | | | | | | | | | |
| January | 102.9 | ---- | ---- | 559 | 1045 | 243 | ---- | 514 | ---- | 568.2 |
| February | 104.0 | ---- | ---- | 551 | 1048 | 240 | ---- | 515 | ---- | 571.1 |
| March | 104.2 | ---- | ---- | 546 | 1034 | 236 | ---- | 514 | ---- | 571.2 |
| April | 101.9 | ---- | ---- | 538 | 1020 | 230 | ---- | 513 | ---- | 570.1 |
| May | 101.6 | ---- | ---- | 537 | 1006 | 227 | ---- | 520 | ---- | 571.2 |
| June | 103.0 | ---- | ---- | 552 | 998 | 223 | ---- | 543 | ---- | 590.9 |
| July | 104.3 | ---- | ---- | 559 | 1009 | 212 | ---- | 557 | ---- | 612.0 |
| August | 103.9 | ---- | ---- | 567 | 993 | 197 | ---- | 557 | ---- | 630.6 |
| September | 103.4 | ---- | ---- | 577 | 996 | 186 | ---- | 556 | ---- | 621.5 |
| October | 103.6 | ---- | ---- | 575 | 989 | 179 | ---- | 572 | ---- | 617.1 |
| November | 104.5 | ---- | ---- | 569 | 977 | 176 | ---- | 605 | ---- | 612.3 |
| December | 103.4 | ---- | ---- | 565 | 977 | 176 | ---- | 633 | ---- | 613.8 |

[1] July.

INDEX NUMBERS OF WHOLESALE PRICES IN THE UNITED STATES AND IN CERTAIN FOREIGN COUNTRIES—Continued

| Country | United States | Canada | Austria | Belgium | Czechoslovakia | Denmark | Finland | France | Germany | Italy |
|---|---|---|---|---|---|---|---|---|---|---|
| Computing agency | Bureau of Labor Statistics (revised) | Dominion Bureau of Statistics (revised) | Federal Statistical Bureau | Ministry of Industry and Labor | Central Bureau of Statistics (revised index) | Statistical Department | Central Bureau of Statistics | General Statistical Bureau | Federal Statistical Bureau | Riccardo Bachi (revised) |
| Base period | 1926 | 1926 | January–June, 1914 | April, 1914 | July, 1914 | 1913 | 1913 | 1913 | 1913 | 1913 |
| Commodities | 550 | 502 | 47 | 128 | 69 | 118 | 135 | 45 | 400 | 138 |
| *Year and month*—Con. | | | | | | | | | | |
| 1926 | | | | | | | | | | |
| January | 103.6 | 103.0 | 122 | 560 | 966 | 172 | 143 | 634 | 135.8 | 608.0 |
| February | 102.1 | 102.1 | 120 | 556 | 950 | 165 | 142 | 636 | 134.3 | 603.5 |
| March | 100.4 | 101.3 | 119 | 583 | 938 | 158 | 141 | 632 | 133.1 | 592.3 |
| April | 100.1 | 101.2 | 119 | 621 | 923 | 157 | 141 | 650 | 132.7 | 590.0 |
| May | 100.5 | 100.2 | 118 | 692 | 928 | 158 | 140 | 688 | 132.3 | 595.8 |
| June | 100.5 | 100.2 | 124 | 761 | 926 | 157 | 141 | 738 | 131.9 | 604.9 |
| July | 99.5 | 100.2 | 126 | 876 | 948 | 158 | 141 | 836 | 133.1 | 618.2 |
| August | 99.0 | 99.1 | 126 | 836 | 963 | 162 | 143 | 769 | 134.0 | 632.5 |
| September | 99.7 | 98.5 | 123 | 859 | 973 | 162 | 143 | 787 | 134.9 | 622.0 |
| October | 99.4 | 98.1 | 125 | 856 | 972 | 178 | 143. | 751 | 136.2 | 596.7 |
| November | 98.4 | 97.6 | 128 | 865 | 978 | 170 | 143 | 684 | 137.1 | 594.2 |
| December | 97.9 | 97.9 | 127 | 860 | 978 | 158 | 144 | 627 | 137.1 | 573.6 |
| 1927 | | | | | | | | | | |
| January | 96.6 | 97.8 | 130 | 856 | 979 | 157 | 144 | 622 | 135.9 | 558.2 |
| February | 95.9 | 97.6 | 130 | 854 | 975 | 156 | 144 | 632 | 135.6 | 555.8 |
| March | 94.5 | 97.3 | 133 | 858 | 976 | 153 | 143 | 641 | 135.0 | 544.7 |
| April | 93.7 | 97.5 | 135 | 846 | 979 | 152 | 143 | 636 | 134.8 | 521.3 |
| May | 93.7 | 98.5 | 137 | 848 | 988 | 152 | 142 | 628 | 137.1 | 496.2 |
| June | 93.8 | 98.9 | 142 | 851 | 990 | 152 | 144 | 622 | 137.9 | 473.4 |
| July | 94.1 | 98.6 | 140 | 845 | 992 | 152 | 144 | 621 | 137.6 | 466.7 |
| August | 95.2 | 98.3 | 133 | 850 | 983 | 153 | 147 | 618 | 137.9 | 465.4 |
| September | 96.5 | 97.1 | 130 | 837 | 975 | 153 | 148 | 600 | 139.7 | 465.4 |
| October | 97.0 | 97.2 | 129 | 839 | 966 | 154 | 148 | 587 | 139.8 | 467.5 |
| November | 96.7 | 96.9 | 127 | 838 | 967 | 154 | 149 | 594 | 140.1 | 466.0 |
| December | 96.8 | 97.3 | 127 | 841 | 975 | 154 | 148 | 604 | 139.6 | 462.9 |
| 1928 | | | | | | | | | | |
| January | 96.3 | 96.9 | 129 | 851 | 982 | 153 | 144 | 607 | 138.7 | 463.5 |
| February | 96.4 | 96.8 | 128 | 848 | 985 | 152 | 143 | 609 | 137.9 | 461.3 |
| March | 96.0 | 97.7 | 129 | 848 | 978 | 153 | 144 | 623 | 138.5 | 463.9 |
| April | 97.4 | 98.3 | 131 | 847 | 984 | 154 | 145 | 624 | 139.5 | 464.4 |
| May | 98.6 | 97.7 | 131 | 844 | 987 | 155 | 143 | 632 | 141.2 | 464.9 |
| June | 97.6 | 97.1 | 133 | 844 | 986 | 155 | 145 | 626 | 141.3 | 461.7 |
| July | 98.3 | 96.2 | 133 | 841 | 979 | 155 | 145 | 624 | 141.6 | 453.1 |
| August | 98.9 | 95.4 | 133 | 831 | 996 | 154 | 147 | 617 | 141.5 | 456.2 |
| September | 100.1 | 95.5 | 131 | 830 | 986 | 151 | 146 | 620 | 139.9 | 457.8 |
| October | 97.8 | 95.4 | 129 | 835 | 971 | 150 | 146 | 617 | 140.1 | 463.3 |
| November | 96.7 | 94.9 | 128 | 847 | 957 | 151 | 145 | 626 | 140.3 | 465.6 |
| December | 96.7 | 94.5 | 127 | 855 | 955 | 151 | 144 | 624 | 139.9 | 464.4 |
| 1929 | | | | | | | | | | |
| January | 97.2 | 94.5 | 128 | 867 | 953 | 151 | ---------- | 631 | 138.9 | 461.2 |
| February | 96.7 | 95.7 | 130 | 865 | 950 | 159 | ---------- | 638 | 139.3 | 462.7 |
| March | 97.5 | 96.1 | 133 | 869 | 964 | 154 | ---------- | 639 | 139.6 | ---------- |

INDEX NUMBERS OF WHOLESALE PRICES IN THE UNITED STATES AND IN CERTAIN FOREIGN COUNTRIES—Continued

| Country | Netherlands | Norway | Spain | Sweden | Switzerland | United Kingdom | Australia | New Zealand | South Africa | Japan | China | India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Computing agency | Central Bureau of Statistics | Central Bureau of Statistics | Institute of Geography and Statistics | Chamber of Commerce | Federal Labor Department | Board of Trade | Bureau of Census and Statistics | Census and Statistics Office (revised) | Office of Census and Statistics | Bank of Japan, Tokyo | Bureau of Markets, Treasury Department, Shanghai | Labor Office, Bombay |
| Base period | 1913 | 1913 | 1913 | 1913 | July, 1914 | 1913 | July, 1914 | 1913 | 1913 | 1913 | 1913 | July, 1914 |
| Commodities | [2] 48 | 95 | 74 | 160 | 120 | 150 | 92 | 180 | 187 | 56 | [3] 117 | 42 |
| *Year and month* | | | | | | | | | | | | |
| 1923 | 151 | 232 | 172 | 163 | ------- | 158.9 | 170 | 158 | 127 | 199 | 156.4 | 181 |
| 1924 | 156 | 268 | 183 | 162 | ------- | 166.2 | 165 | 165 | 129 | 206 | 153.9 | 182 |
| 1925 | 155 | 253 | 188 | 161 | ------- | 159.1 | 162 | 161 | 128 | 202 | 159.4 | 163 |
| 1926 | 145 | 198 | 181 | 140 | 145 | 148.1 | 161 | 154 | 123 | 179 | 164.1 | 149 |
| 1927 | 148 | 167 | 172 | 146 | 142 | 141.4 | 159 | 147 | 124 | 170 | 170.4 | 147 |
| 1928 | 149 | 161 | 168 | 148 | 145 | 140.3 | 157 | 148 | 121 | 171 | 160.7 | ------- |
| 1923 | | | | | | | | | | | | |
| January | 157 | 223 | 170 | 163 | ------- | 157.0 | 163 | ------- | 131 | 184 | 152.7 | 181 |
| April | 156 | 229 | 174 | 168 | ------- | 162.0 | 167 | ------- | 126 | 196 | 157.7 | 180 |
| July | 145 | 231 | 170 | 162 | ------- | 156.5 | 180 | ------- | 124 | 192 | 155.4 | 178 |
| October | 148 | 235 | 171 | 161 | ------- | 158.1 | 171 | ------- | 125 | 212 | 156.1 | 181 |
| 1924 | | | | | | | | | | | | |
| January | 156 | 251 | 178 | 161 | ------- | 165.4 | 174 | ------- | 131 | 211 | 155.8 | 188 |
| April | 154 | 263 | 184 | 161 | ------- | 164.7 | 166 | ------- | 126 | 207 | 153.7 | 184 |
| July | 151 | 265 | 182 | 157 | ------- | 162.6 | 163 | ------- | 125 | 195 | 151.5 | 184 |
| October | 161 | 273 | 186 | 167 | ------- | 170.0 | 163 | ------- | 133 | 213 | 152.8 | 181 |
| 1925 | | | | | | | | | | | | |
| January | 160 | 279 | 191 | 169 | ------- | 171.1 | 163 | 166 | 130 | 214 | 159.9 | 173 |
| February | 158 | 281 | 192 | 169 | ------- | 168.9 | 162 | 162 | ------- | 210 | 159.2 | 173 |
| March | 155 | 279 | 193 | 168 | ------- | 166.3 | 160 | 162 | ------- | 204 | 160.3 | 171 |
| April | 151 | 273 | 190 | 163 | ------- | 161.9 | 158 | 162 | 130 | 202 | 159.3 | 165 |
| May | 151 | 262 | 191 | 162 | ------- | 158.6 | 159 | 162 | ------- | 199 | 157.8 | 164 |
| June | 153 | 260 | 187 | 161 | ------- | 157.2 | 162 | 162 | ------- | 200 | 157.3 | 160 |
| July | 155 | 254 | 188 | 161 | ------- | 156.9 | 162 | 161 | 127 | 198 | 162.8 | 158 |
| August | 155 | 249 | 184 | 159 | ------- | 156.2 | 162 | 161 | ------- | 200 | 160.3 | 160 |
| September | 155 | 237 | 185 | 157 | ------- | 155.1 | 162 | 160 | ------- | 201 | 160.2 | 157 |
| October | 154 | 223 | 187 | 154 | ------- | 153.9 | 163 | 162 | 124 | 200 | 159.0 | 158 |
| November | 154 | 220 | 186 | 155 | ------- | 152.7 | 165 | 161 | ------- | 198 | 158.4 | 160 |
| December | 155 | 220 | 187 | 156 | ------- | 152.1 | 160 | 160 | ------- | 194 | 158.1 | 154 |
| 1926 | | | | | | | | | | | | |
| January | 153 | 214 | 186 | 153 | 153 | 151.3 | 161 | 159 | 124 | 192 | 164.0 | 154 |
| February | 149 | 211 | 186 | 152 | 147 | 148.8 | 160 | 159 | ------- | 188 | 163.0 | 151 |
| March | 145 | 205 | 183 | 149 | 146 | 144.4 | 163 | 157 | ------- | 184 | 164.4 | 150 |
| April | 143 | 199 | 179 | 150 | 145 | 143.6 | 168 | 156 | 120 | 181 | 162.8 | 151 |
| May | 143 | 197 | 179 | 151 | 143 | 144.9 | 167 | 156 | ------- | 177 | 159.7 | 151 |
| June | 144 | 194 | 177 | 150 | 143 | 146.4 | 163 | 155 | ------- | 177 | 155.8 | 150 |
| July | 141 | 192 | 178 | 148 | 145 | 148.7 | 162 | 156 | 122 | 179 | 156.9 | 149 |
| August | 139 | 193 | 180 | 147 | 142 | 149.1 | 162 | 154 | ------- | 177 | 160.5 | 148 |
| September | 140 | 193 | 178 | 146 | 142 | 150.9 | 158 | 153 | ------- | 176 | 164.2 | 149 |
| October | 143 | 198 | 179 | 148 | 144 | 152.1 | 154 | 153 | 127 | 174 | 171.1 | 147 |
| November | 147 | 199 | 185 | 148 | 142 | 152.4 | 155 | 151 | ------- | 171 | 174.4 | 146 |
| December | 147 | 184 | 186 | 150 | 142 | 146.1 | 155 | 153 | ------- | 170 | 172.0 | 146 |

[2] 52 commodities in 1920; 53 commodities from August, 1920, to December, 1921.
[3] 147 items.

INDEX NUMBERS OF WHOLESALE PRICES IN THE UNITED STATES AND IN CERTAIN FOREIGN COUNTRIES—Continued

| Country | Netherlands | Norway | Spain | Sweden | Switzerland | United Kingdom | Australia | New Zealand | South Africa | Japan | China | India |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Computing agency | Central Bureau of Statistics | Central Bureau of Statistics | Institute of Geography and Statistics | Chamber of Commerce | Federal Labor Department | Board of Trade | Bureau of Census and Statistics | Census and Statistics Office (revised) | Office of Census and Statistics | Bank of Japan, Tokyo | Bureau of Markets, Treasury Department, Shanghai | Labor Office, Bombay |
| Base period | 1913 | 1913 | 1913 | 1913 | July, 1914 | 1913 | July, 1914 | 1913 | 1913 | 1913 | 1913 | July, 1914 |
| Commodities | [2] 48 | 174 | 74 | 160 | 78 | 150 | 92 | 180 | 187 | 56 | [3] 117 | 44 |
| *Year and month*—Con. | | | | | | | | | | | | |
| 1927 | | | | | | | | | | | | |
| January | 145 | 174 | 184 | 146 | 141 | 143.6 | 154 | 151 | 128 | 170 | 172.8 | 146 |
| February | 146 | 172 | 180 | 146 | 141 | 142.6 | 153 | 147 | ------- | 171 | 172.0 | 148 |
| March | 144 | 167 | 179 | 145 | 141 | 140.6 | 150 | 147 | ------- | 171 | 174.7 | 146 |
| April | 143 | 164 | 177 | 143 | 140 | 139.8 | 151 | 147 | 126 | 170 | 173.1 | 145 |
| May | 145 | 162 | 172 | 145 | 141 | 141.1 | 152 | 145 | ------- | 171 | 171.3 | 146 |
| June | 149 | 166 | 171 | 146 | 140 | 141.8 | 155 | 146 | ------- | 172 | 169.3 | 147 |
| July | 151 | 165 | 168 | 146 | 140 | 141.1 | 161 | 146 | 120 | 170 | 171.0 | 147 |
| August | 149 | 167 | 168 | 146 | 142 | 140.9 | 165 | 146 | ------- | 167 | 170.8 | 148 |
| September | 150 | 167 | 169 | 148 | 144 | 142.1 | 170 | 146 | ------- | 169 | 171.8 | 148 |
| October | 150 | 165 | 169 | 147 | 145 | 141.4 | 173 | 146 | 122 | 170 | 168.7 | 146 |
| November | 151 | 166 | 168 | 148 | 147 | 141.1 | 166 | 147 | ------- | 168 | 165.7 | 144 |
| December | 151 | 166 | 169 | 148 | 146 | 140.4 | 162 | 148 | ------- | 168 | 163.5 | 143 |
| 1928 | | | | | | | | | | | | |
| January | 153 | 164 | 166 | 148 | 145 | 141.1 | 163 | 150 | 123 | 169 | 163.1 | 141 |
| February | 150 | 163 | 166 | 147 | 144 | 140.3 | 160 | 147 | ------- | 169 | 164.3 | 142 |
| March | 152 | 164 | 165 | 149 | 145 | 140.8 | 160 | 147 | ------- | 169 | 163.4 | 140 |
| April | 153 | 162 | 166 | 151 | 146 | 142.9 | 162 | 147 | 121 | 170 | 163.1 | 142 |
| May | 152 | 162 | 164 | 152 | 145 | 143.6 | 159 | 148 | ------- | 171 | 164.5 | 145 |
| June | 153 | 161 | 164 | 151 | 145 | 142.6 | 158 | 148 | ------- | 169 | 160.0 | 149 |
| July | 148 | 162 | 164 | 150 | 144 | 141.1 | 157 | 148 | 119 | 169 | 159.2 | 147 |
| August | 144 | 162 | 166 | 149 | 144 | 139.3 | 154 | 147 | ------- | 170 | 157.2 | 146 |
| September | 145 | 158 | 168 | 146 | 144 | 137.6 | 153 | 148 | ------- | 174 | 156.2 | 148 |
| October | 146 | 157 | 174 | 145 | 145 | 137.9 | 152 | 149 | 120 | 174 | 158.8 | 150 |
| November | 148 | 157 | 176 | 145 | 145 | 137.9 | 152 | 150 | ------- | 173 | 159.2 | 149 |
| December | 148 | 157 | 175 | 145 | 144 | 138.3 | 154 | 149 | ------- | 174 | 159.9 | 145 |
| 1929 | | | | | | | | | | | | |
| January | 146 | 154 | 171 | 144 | 143 | 138.3 | 157 | 147 | 120 | 172 | 160.1 | 148 |
| February | 146 | 155 | 175 | 145 | 143 | 138.4 | 156 | 146 | ------- | 171 | 162.4 | 150 |
| March | ------- | 155 | ------- | 144 | 142 | 140.1 | ------- | ------- | ------- | 171 | ------- | ------- |

[2] 52 commodities in 1920; 53 commodities from August, 1920, to December, 1921.
[3] 147 items.

# IMMIGRATION AND EMIGRATION

## Statistics of Immigration for March, 1929

By J. J. Kunna, Chief Statistician, United States Bureau of Immigration

THE monthly statistics for March, 1929, show an increase in the inward movement of both aliens and citizens as compared with the previous month. In March 33,638 aliens were admitted to the United States and 37,375 American citizens returned, as against 27,862 and 33,216, respectively, for February.

During March 1,464 aliens were refused admission to the United States, 1,299 having been turned back at points along the Canadian and the Mexican borders and 165 at the seaports of entry. Of the latter number only 72 were rejected at New York, at which port over four-fifths of the aliens from overseas landed. About 3 out of every 1,000 alien applicants for admission at New York this month were denied admission.

Undesirable aliens deported from the United States numbered 1,352 for the month of March, 1929. The average number of deportees for the nine months ended March 31, 1929, was 1,006, compared with 955 for the same months a year ago. The principal cause for deportation during the last nine months was entering the country without proper immigration visa, 4,583, or a little over half of the total, having been returned to the countries whence they came for this reason. The criminal and immoral classes for the same period numbered 1,346, and mentally or physically defective 538. The remaining 2,591 aliens deported during the nine months from July to March last were returned for miscellaneous causes under the general immigration laws.

A total of 104,349 immigrants of the class charged to the quota were admitted during the nine months ended March 31, 1929, or 63.4 per cent of the annual quota of 164,667, as compared with 113,244, or 68.7 per cent, for the same months of the fiscal year 1927–28. Other principal classes for the first nine months of the current fiscal year 1928–29 included 76,430 aliens admitted under the immigration act of 1924 as returning residents, 73,210 as natives of nonquota countries, 44,823 as visitors for business or pleasure, 21,351 as husbands, wives, or unmarried children of American citizens, and 18,806 as transients passing through the United States on their way elsewhere.

New York State continues to be the principal settling ground of the new arrivals to this country, about one out of three of the immigrant aliens admitted during the nine months from July to March last giving the Empire State as his intended future permanent residence. The next seven States in the order of importance in the destination of immigrants were Texas, Michigan, Massachusetts, Illinois, California, New Jersey, and Pennsylvania. Only 20 per cent of the total immigrants entering this country during the said nine months were recorded as going to the other States to make their future home. The compiled statistics covering the occupation given

by these immigrants at the time of their arrival show that the largest groups among the wage-earners were the skilled workers, servants, common laborers, and farm laborers. Over one-third of the total were women and children who gave no occupation.

INWARD AND OUTWARD PASSENGER MOVEMENT FROM JULY 1, 1928, TO MARCH 31, 1929

| Period | Inward | | | | | | Outward | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Aliens admitted | | | United States citizens arrived | Total | Aliens debarred from entering [1] | Aliens departed | | | United States citizens departed | Total | Aliens deported after landing [2] |
| | Immigrant | Non-immigrant | Total | | | | Emigrant | Non-emigrant | Total | | | |
| 1928 | | | | | | | | | | | | |
| July–December | 147,707 | 110,483 | 258,190 | 268,338 | 526,528 | 9,105 | 44,677 | 104,746 | 149,423 | 243,087 | 392,510 | 5,651 |
| 1929 | | | | | | | | | | | | |
| January | 17,806 | 10,440 | 28,246 | 23,450 | 51,696 | 1,870 | 4,670 | 10,938 | 15,608 | 28,808 | 44,416 | 1,019 |
| February | 17,254 | 10,608 | 27,862 | 33,216 | 61,078 | 1,461 | 4,154 | 10,358 | 14,512 | 32,347 | 46,859 | 1,036 |
| March | 20,145 | 13,493 | 33,638 | 37,375 | 71,013 | 1,464 | 2,449 | 6,917 | 9,366 | 27,972 | 37,338 | 1,352 |
| Total | 202,912 | 145,024 | 347,936 | 362,379 | 710,315 | 13,900 | 55,950 | 132,959 | 188,909 | 332,214 | 521,123 | 9,058 |

[1] These aliens are not included among arrivals, as they were not permitted to enter the United States.
[2] These aliens are included among aliens departed, they having entered the United States, legally or illegally, and later being deported.

# PUBLICATIONS RELATING TO LABOR

## Official—United States

ARIZONA.—Industrial Commission. *Second annual report, for the year ending December 31, 1927.* [*Phoenix, 1928?*] *15 pp.*

Reviews the operation of the Arizona State insurance fund.

CALIFORNIA.—Department of Industrial Relations. Bureau of Labor Statistics (the division of labor statistics and law enforcement). *Twenty-third biennial report, 1927–28. Sacramento, 1929. 344 pp.*

The section of this publication which deals with the collection of unpaid wages is summarized in this issue.

—— Industrial Welfare Commission. *Sixth report, for the biennial period July 1, 1926, to June 30, 1928. Sacramento, 1929. 136 pp.*

One of the sections of this report gives statistics on the results of minimum wage regulation in California, which the commission considers furnish conclusive evidence against various claims made by the opponents of such regulation. The publication also contains tables showing weekly earnings of women and minors, by industries and localities.

IDAHO.—Industrial Accident Board. *Sixth report, from November 1, 1926, to October 31, 1928.* [*Boise, 1928?*] *161 pp.*

Reviewed in this issue.

INDIANA.—Industrial Board. *Annual report for the fiscal year ending September 30, 1928. Indianapolis, 1929. 69 pp.*

Reviewed in this issue.

MARYLAND.—Industrial Accident Commission. *Fourteenth annual report, for the year November 1, 1927, to October 31, 1928, inclusive. Baltimore* [*1929?*]. *45 pp.*

MINNESOTA.—Legislature. Senate. Interim Committee on Old Age Pensions. *Report.* [*St. Paul, 1929?*] *14 pp.*

After surveying the cost of caring for the aged under the almshouse system, and considering what has been done in States which have adopted an old-age pension system, the committee recommended that Minnesota should pass a pension law following rather closely the details of the plans in use elsewhere. This recommendation was accepted, a pension system having been established at the present session of the State legislature. The report contains a table showing for each county in the State the expenditure on poorhouses and poor farms, giving the amount invested in site and buildings, and the annual cost of operation for each year from 1920 to 1927.

NEVADA.—Industrial Commission. *Biennial report, reviewing the administration of the Nevada industrial insurance act for the period July 1, 1926, to June 30, 1928. Carson City, 1929. 28 pp.*

Reviewed in this issue.

NEW HAMPSHIRE.—Bureau of Labor. *Seventeenth biennial report, for the fiscal period ending June 30, 1928. Concord, 1928. 98 pp.*

Reviewed in this issue.

NEW JERSEY.—Department of Agriculture. *Circular No. 153: The principles of consumers', producers', and credit cooperation—a historical outline, by Dimitry T. Pitt. Trenton, 1929. 53 pp.*

NEW MEXICO.—Inspector of Coal Mines. *Seventeenth annual report, for the year ending October 31, 1928.* [*Gallup, 1928?*] *50 pp.*

Contains data on production, number of employees, days worked, and fatal and nonfatal accidents in specified coal mines in New Mexico, November 1, 1927, to October 31, 1928.

NEW YORK.—Department of Labor. *Synopsis of proceedings of the twelfth annual New York State industrial safety congress, held under the auspices of the Department of Labor of the State of New York, Syracuse, December 4–6, 1928. Albany, 1929. 23 pp.*

NORTH DAKOTA.—Coal Mine Inspection Department. *Tenth annual report, 1928. Bismarck* [*1929?*]. *46 pp., illus.*

Shows by county and by mine the number of days each mine was operated, the number of employees, output, and condition of mine, with data on fatal and nonfatal accidents.

OHIO.—Industrial Commission. Division of Safety and Hygiene. *Proceedings of second all-Ohio safety congress, Columbus, November 13–15, 1928. Columbus* [*1928?*]. *394 pp.*

PORTO RICO.—Governor. *Twenty-eighth annual report, for the fiscal year ended June 30, 1928. Washington, 1929. 78 pp.* (*House doc. No. 371, 70th U. S. Cong., 2d sess.*)

The part of the report which deals with labor conditions is reviewed in this issue.

UTAH.—Industrial Commission. [*Biennial report, July 1, 1926, to June 30, 1928.*] *Bulletin No. 1: Synopsis of decisions rendered by the commission and digest of supreme court rulings. 288 pp. Bulletin No. 2: Financial statement of the State insurance fund; industrial commission of Utah; firemen's pension fund; employees' combined injury benefit fund. 19 pp. Bulletin No. 3: Industrial accident statistical report. 139 pp. Bulletin No. 4: Coal and metal mine reports, including report of factory and labor inspections. 176 pp. Bulletin No. 5: Utah agricultural statistics, compiled by the U. S. Department of Agriculture, Bureau of Agricultural Economics. 49 pp.* [*Salt Lake City, 1928.*]

Bulletin No. 3 is reviewed in this issue.

WEST VIRGINIA.—Bureau of Labor. *Nineteenth biennial report, 1927–1928. Charleston* [*1928?*]. *132 pp.*

Contains data on manufacturing industries, including number of employees, average wages paid, and average days worked (calendar years 1926 and 1927), and child labor permits granted, by counties (October, 1926, to October, 1928). The greater part of the publication is devoted to a directory of industries.

WYOMING.—Department of Labor and Statistics. *Sixth biennial report, 1927–1928. Cheyenne, 1928. 36 pp.*

Statistics on wages and hours from the above publication are given in this issue.

UNITED STATES.—Department of Commerce. Bureau of Mines. *Miners' circular 32: Use of a type N miners' gas mask. Washington, 1929. 29 pp., illus.*

Describes the gases found in mines, and the type N miners' gas mask, outlining the care the mask should receive and the organization and methods under which crews equipped with gas masks should operate in mines.

—— —— —— *Miners circular 35: Advanced mine-rescue training. Part III.—Protection against gases encountered in mines, by J. J. Forbes and G. W. Grove. Washington, 1929. 53 pp.; diagrams, illus.*

—— —— Bureau of Navigation. *Merchant marine statistics, 1928. Washington, 1929. 76 pp.*

Wage rates of American and foreign seamen, taken from this report, are given in this issue.

UNITED STATES.—Department of Commerce. Bureau of Standards. *Miscellaneous publication No. 91: Standards yearbook, 1929. Washington, 1929. 401 pp.*

—— Department of Labor. Bureau of Labor Statistics. *Bulletin No. 473: Wholesale prices, 1913 to 1927. Washington, 1929. 299 pp., charts.*

—— —— —— *Bulletin No. 482: Union scales of wages and hours of labor, May 15, 1928. Washington, 1929. 241 pp.*

Advance data from this survey were published in the Labor Review for September, 1928 (pp. 114–137), and November, 1928 (pp. 10–18).

—— —— Women's Bureau. *Bulletin No. 61: The development of minimum wage laws in the United States, 1912 to 1927. Washington, 1928. 635 pp.*

—— —— —— *Bulletin No. 67: Women workers in Flint, Mich. Washington, 1929. 79 pp.*

Reviewed in this issue.

## Official—Foreign Countries

AUSTRALIA.—Court of Conciliation and Arbitration. *Commonwealth arbitration reports, vol. 24: A report of cases decided and awards made, including conferences convened by their honors the judges of the court and by deputy presidents thereof, from July 19, 1926, to February 28, 1927. Melbourne* [1927?]. *xliii, 970 pp.*

—— (QUEENSLAND).—Registrar-General's Office. Statistical Branch. *A B C of Queensland and Australian statistics, 1929. Brisbane, 1929. 287 pp.; map.*

In addition to the usual statistical summary of the State's condition and activities, the handbook gives the membership of registered trade-unions for the Commonwealth as a whole, and for each of the States. As of July 16, 1928, the total membership for the Commonwealth was 769,048. The largest single group was the Australian Workers' Union, with 135,777 members, followed by the Australian Railways Union with 44,739. These were also the leading unions in Queensland, where the first had a membership of 53,919 and the second of 15,502.

BULGARIA.—Direction Générale de la Statistique. *Statistique des coopératives dans le Royaume de Bulgarie en 1925. Sofia, 1929. 161 pp.*

Contains detailed data on the various types of cooperative societies in Bulgaria, covering number of societies, membership, financial statistics, etc., at the end of 1925.

CANADA.—Department of Labor. *Report for the fiscal year ending March 31, 1928. Ottawa, 1929. 200 pp.*

Reviews the operation of the industrial disputes investigation act, the Government annuities act, the old-age pensions act, and the fair-wages policy, conciliation work, labor legislation, strikes and lockouts, fatal industrial accidents, and the work of the Employment Service.

—— (NEW BRUNSWICK).—Workmen's Compensation Board. *Tenth annual report, 1928. St. John, 1929. 38 pp.*

—— (NOVA SCOTIA).—Commission on Old Age Pensions. *Interim report. Halifax, 1929. 20 pp.*

The interim report is directed mainly to a consideration of the probable cost to Nova Scotia of maintaining an old-age pension system, and of the means by which the money needed might be raised. While the work of gathering and compiling statistics on this point is yet in progress, the committee feel that enough has been accomplished to indicate that the cost would be almost prohibitive. The age composition of the western Canadian Provinces, it points out, is unfavorable to such a system. In the eastern Provinces which have up to date adopted the Canadian system the number of septuagenarians per 1,000 population ranges from

11.65 in Saskatchewan to 18.42 in British Columbia; in Nova Scotia it is 47.26, a difference which the commission feels is a strong argument against following the western example.

CANADA (NOVA SCOTIA).—Department of Public Works and Mines. *Report on the mines, 1928. Halifax, 1929. 515 pp.; map, illus.*

In the fiscal year ending September 30, 1928, the average number of men employed at the coal mines in Nova Scotia was 13,431, an increase of 178 over the preceding year. In the later year 3,093,584 man-days were worked—111,169 less than in the fiscal year 1927. The coal output for 1928 was 6,020,203 tons, a decrease of 623,002 tons as compared with 1927, but in the later period 39,474 tons were shipped to the United States as compared with 3,551 tons during the preceding year.

—— Workmen's Compensation Board. *Report for 1928. Halifax, 1929. 30 pp.*

Reviewed in this issue.

—— (SASKATCHEWAN).—Commission on Workmen's Compensation for Saskatchewan. *Report. Regina, 1929. 30 pp.*

Reviewed in this issue.

FRANCE.—Ministère du Travail, de l'Hygiène, de l'Assistance et de la Prévoyance Sociales. *Statistique annuelle des institutions d'assistance, 1926. Paris, 1928. lvi, 69 pp.*

The annual report of the French Ministry of Labor and Hygiene for 1926 on institutions of assistance covers old-age and permanent invalidity, temporary invalidity, maternity and infant care, insane asylums, and other public-welfare institutions.

GREAT BRITAIN.—..edical Research Council. *Report for the year 1927–28. London, 1929. 165 pp. (Cmd. 3276.)*

This report contains a brief summary (pp. 137–144) of the various researches conducted during the year into industrial diseases, both by special committees and by the Industrial Fatigue Research Board.

—— Mines Department. Miners' Welfare Fund. *Seventh report of the committee appointed by the board of trade to allocate the fund, together with the second report of the selection committee appointed to administer the Miners' Welfare National Scholarship Scheme, 1928. London, 1929. 74 pp.; plans, illus.*

Reviewed in this issue.

—— Registry of Friendly Societies. *Report for the year 1927. Part 4: Trade-unions. London, 1929. 45 pp.*

Gives a statement of the changes in trade-union rules made necessary by the passage of the trade disputes and trade-unions act of 1927, and data as to union membership and finances.

GREECE.—Ministère de l'Économie Nationale. Direction du Service Minier. *Statistique de l'industrie minière de la Grèce pendant l'annee 1927. Athens, 1928. 44 pp.*

The annual report of the Bureau of Mines of Greece for the year 1927 gives the production of minerals, of iron and steel, and of marble during the year, and the number of workers, the total days worked, and the wages of employees in mines and quarries.

INTERNATIONAL LABOR CONFERENCE. *Draft convention and recommendation adopted by the conference at its eleventh session, May 30–June 16, 1928. London, 1928. 11 pp.*

This pamphlet contains the authentic text of the draft convention concerning the creation of minimum wage fixing machinery and the recommendation concerning its application which were adopted at the eleventh session of the conference.

INTERNATIONAL LABOR OFFICE.—*Hours of work of salaried employees. Report of draft questionnaire. (Item IV on agenda of International Labor Conference, twelfth session, Geneva, May, 1929, first discussion). Geneva, 1929. 216 pp.*

A brief summary of this report is given in this issue.

—— *International survey of legal decisions on labor law, 1927. Geneva, 1928. xlvii, 335 pp.*

Reviewed in this issue.

—— *Report on prevention of industrial accidents. (Item 1 on the agenda, International Labor Conference, twelfth session, Geneva, May, 1929. Second discussion, Report I.) Geneva, 1929. 219 pp.*

—— *Report on the protection against accidents of workers engaged in loading or unloading ships. (Item II on agenda of International Labor Conference, twelfth session, Geneva, May, 1929. Second discussion, Report II.) Geneva, 1929. 181 pp.*

—— *Studies and reports, series F, second section (safety), No. 3: Hydro-extractors —their safe construction and equipment. Geneva, 1929. 102 pp.; diagrams, illus.*

POLAND.—Ministry of Labor and Social Welfare. *Ten years of social policy in Poland, 1918–1928. Warsaw, 1928. 72 pp.; map, charts.*

Contains history and organization of the ministry and chapters on various phases of the development of labor conditions in the Republic.

RUSSIA (PROVINCE OF MOSCOW).—Statistical Board of Moscow. *Statistical-economic hand book of the city and Province of Moscow from 1923–24 to 1927–28. Moscow, 1929. 567 pp. (Published in Russian.)*

The handbook contains statistical information on social welfare, unemployment, wages, hours, social insurance, and other labor conditions, food, lodging, industry, agriculture, transportation, commerce, prices, credit, and cooperation.

## Unofficial

ANTHRACITE BOARD OF CONCILIATION. *Report, Vol. XV. Hazleton, Pa. [1928?] 335 pp.*

ARCHIV FÜR WOHLFAHRTSPFLEGE. *Bibliographie der Wohlfahrtspflege für 1927, bearbeitet von Sofie Götze. Berlin, 1928. 247 pp.*

A bibliography of books and articles in periodicals (German) related to social welfare work and published in 1927. The subjects covered include vocational guidance, employment services, legal matters related to labor, labor protection, care of unemployed workers, unemployment insurance, etc.

CATHCART, E. P. *The human factor in industry. London, Oxford University Press, 1928. 105 pp.; diagrams.*

COHEN, I. DAVID. *Principles and practices of vocational guidance. New York, Century Co., 1929. 471 pp.; charts.*

This book is one of the Century vocational series, and was written to meet the real need in the vocational guidance field for a defining of issues, a setting forth of conflicting viewpoints, an analysis of situations, a clear statement of problems, an exposition of methods and procedures, and suggestions regarding sources of additional information and other aids.

COOPERATIVE UNION (LTD.). *The cooperative directory, 1928. Manchester, England, Holyoake House, 1928. 424 pp.*

Directory of all cooperative societies in the United Kingdom registered under the industrial and provident societies acts, including those affiliated with the Cooperative Union.

COX, JOHN W. *Mechanical aptitude. London, Methuen & Co. (Ltd.), 1928. 209 pp.; diagrams.*

In his final summary the author claims that the results of his study of mechanical aptitude have an important bearing on psychological theory, on educational practice, and on mental testing in industry. In the last-mentioned connection the results, he thinks, suggest that the tests should be found of practical value in occupational analysis, selection, and placement, and in vocational guidance.

DUNN, ROBERT W. *Labor and automobiles. New York, International Publishers, 1929. 224 pp., illus.*

A discussion of present-day labor conditions in the automobile industry, written from a labor point of view.

GUERMONPREZ, FR. *Études médicales autour de la loi du 5 avril 1928 relative aux assurances sociales. Paris, Amédée LeGrand, 1928. 238 pp.*

A discussion of the French social insurance law from the medical point of view.

INSTITUT INTERNATIONAL D'AGRICULTURE. *Annuaire international de législation agricole, XVII^ème année, 1927. Rome, 1928. lxxi, 354 pp.*

The annual compilation of laws relating to agriculture, issued by the International Institute of Agriculture. Among these are the statutes and decrees relating to agricultural cooperative associations, collective agreements for farm work, rural housing, chambers of labor, emigration, and immigration.

INTERNATIONAL FEDERATION OF TEXTILE WORKERS. *Report of the twelfth congress, held in Ghent, May 28–June 1, 1928.* [*London, 1928?*] *72 pp.*

Includes an extended discussion of family allowances.

INTERNATIONALE LANDARBEITER-FÖDERATION. *Berichtdes Sekretärs über die Tätigkeit in der Zeit vom September 1926 bis August 1928.* [*Prague, 1928?*] *103 pp.*

Contains the proceedings of the fifth convention of the International Farm Workers' Federation, held at Prague, September 23–25, 1928.

LABOR AND SOCIALIST INTERNATIONAL. *Reports and proceedings of the third congress, Brussels, August 5–11, 1928. London, 1928. 3 vols.*

The agenda of the congress included the following subjects: The world political situation and the international labor movement, militarism and disarmament, the colonial problem, the postwar economic situation and the economic policy of the working class, report and proposals by the Women's International Conference, and organization questions of the Labor and Socialist International.

LANDIS, BENSON Y., Editor. *Handbook of rural social resources, 1928. Chicago, University of Chicago Press, 1928. 226 pp.*

LORWIN, LEWIS L. *Labor and internationalism. New York, Macmillan Co., 1929. 682 pp.; maps.*

This volume "traces the origin of the idea of international labor cooperation, the successive attempts to embody it in functional organizations, the effect that it has had on world history, and the complex systems of international associations which seek to make the idea a living reality to-day."

MAGUIRE, JOHN MACARTHUR. *The lance of justice: A semicentennial history of the Legal Aid Society* [*of the city of New York*], *1876–1926. Cambridge, Harvard University Press, 1928. 305 pp.*

Tells the encouraging story of the expansion of legal aid activities in New York City from experimental beginnings over a half a century ago to the present important permanent organization of the work which the bar considers "a patriotic and social service of the highest order."

MCCAHAN, DAVID. *State insurance in the United States. Philadelphia University of Pennsylvania Press, 1929. 290 pp.*

McLean, Robert N. *That Mexican! As he really is, north and south of the Rio Grande. New York, Fleming H. Revell Co., 1928. 184 pp., illus.*

A friendly picture of the Mexican laborer in his own country and in the United States.

Metropolitan Life Insurance Co. Policyholders Service Bureau. *Rayon—a new influence in the textile industries. New York [1929?]. 31 pp.*

Reviewed in this issue.

Minnesota Co-op Oil Co. *The cooperative oil movement in the Northwest. Minneapolis [1928?]. 16 pp.*

Contains an account of the growth of the cooperative oil movement in Minnesota, including the central buying organization, the Minnesota Co-op Oil Co., some statistical information concerning the movement, and a list of the oil associations in the North Central States.

Molin, P. *Le mouvement coopératif en Finlande—son rôle économique et social. Paris, Librairie Générale de Droit et de Jurisprudence, 1928. 175 pp.; maps.*

Describes the rise and growth of the various forms taken by the cooperative movement in Finland, and attempts to evaluate the social and economic importance of the movement. Statistics given cover only to 1924 or 1925. Certain data from this report are given in the present issue of the Labor Review.

Moton, Robert Russa. *What the negro thinks. New York, Doubleday, Doran & Co. (Inc.), 1929. 267 pp.*

A calm and dispassionate discussion of the negro's reaction to the experiences to which he is subjected because of his race and color. "The book indicates in particular the things in which the negro is discriminated against, and aims to tell those of other races who are interested in the subject something of how it feels to be constantly subjected to such discriminations, and to reveal the thoughts of the negro inspired by those feelings whenever he has occasion to reflect on his experiences."

National Bureau for the Advancement of Music. *Music in industry, by Kenneth S. Clark. New York, 45 West 45th Street, 1929. 383 pp., illus.*

This survey of the musical activities among employees of industrial establishments not only shows the extent to which musical organizations have been developed in industry, but discusses the ways in which to organize the musical talent which exists among every group of employees. The study covered 679 industrial or commercial establishments in all of which there were one or more groups interested in the development of a band, orchestra, chorus, or other musical organization. The study brings out the advantages accruing to both employers and employees from these activities.

New York Tuberculosis and Health Association. *Employment of the tuberculous, by Alice C. Klein and Grant Thorburn. New York, 1928. 71 pp.*

This study covers the results of a 3-year experiment in supervised employment and medical follow up of quiescent and arrested cases of tuberculosis with a view to determining whether such supervision and aftercare would result in any lowering in the relapse rate among such persons.

Ogburn, William F., Editor. *Recent social changes in the United States since the war and particularly in 1927. Chicago, University of Chicago Press, 1929. 230 pp.; charts.*

A collection of articles on a wide range of topics, by different authors, first published in the American Journal of Sociology for July, 1928.

PAN-PACIFIC WOMEN'S CONFERENCE, FIRST. *Women of the Pacific: Being a record of the proceedings of the first Pan-Pacific Women's Conference, which was held in Honolulu from the 9th to the 19th of August, 1928, under the auspices of the Pan-Pacific Union. Honolulu, Pan-Pacific Union, 1928. 280 pp.*

In the industrial section of the conference the following were the main topics discussed: Hours, wages, industrial standards in the Pacific countries, social significance of employed women, the trade-union woman, and workers' education. The proceedings of the health section included addresses and discussion on industrial hygiene.

RAGER, FRITZ. *Wer Kann die Altersfürsorgerente in Österreich Beziehen? Vienna, "Arbeit und Wirtschaft," 1929. 116 pp. (Second revised edition.)*

Contains a review of old-age insurance in Austria.

RECORDS OF PROGRESS. *Vol. XII, No. 1, April, 1929. Yellow Springs, Ohio. 115 pp.*

The first American issue of this international review, which is the official organ of the League for the Organization of Progress and of the International Institute for the Exchange of Social Experience. Among the subjects treated in this number are modern tendencies in the organization of charity, health insurance in the United States, what lies behind our votes, and democratic disarmament.

ROYAL ECONOMIC SOCIETY. *Memorandum No 12: A new index number of wages, by A. L. Bowley. London, W. C. 2, 9 Adelphi Terrace, January, 1929. 7 pp.*

DE SEVELINGES, JEAN-BAPTISTE. *Les allocations familiales dans l'agriculture. Paris, Librairie du Recueil Sirey, 1928. 135 pp.*

Traces the development of family allowances in France, gives statistics on family allowance funds both in industry and in agriculture, emphasizes the advantages of these grants in agriculture, and proposes a plan for their further generalization through the agricultural associations (*syndicats agricoles*).

SOCIETE DE LÉGISLATION COMPARÉE. *Annuaire de législation française contenant le texte des principales lois votées en France en 1926. Paris, 1927. 295 pp.*

—— *Annuaire de législation française, contenant le texte des principales lois votées en France en 1927. Paris, 1928. 248 pp.*

These volumes contain the text and a brief discussion of the most important laws passed in France in 1926 and 1927. The laws which are effective in the French colonies are also noted.

STROH, LOUIS. *L'étranger et les assurances sociales. Paris, Librairie du Recueil Sirey, 1929. 31 pp.*

A discussion of the legal status of foreigners in regard to the social insurance laws of France.

TOKYO CHAMBER OF COMMERCE AND INDUSTRY. *The annual statistical report, 1926 and 1927. Tokyo, 1928. 238 pp.*

Contains tables on prices, wages, production, number of employees in factories, and various commercial subjects.

VERBAND SCHWEIZ. KONSUMVEREINE (V. S. K.). *Rapports et comptes sur l'activité des organes de l'union en 1928. Basel, 1929. 89 pp.*

Detailed report of the Swiss Union of Comsumers' Cooperative Societies for 1928.

WARE, NORMAN J. *The labor movement in the United States, 1860–1895: A study in democracy. New York, D. Appleton & Co., 1929. 409 pp.*

A continuation of the author's history of the labor movement in this country, begun in his essay, The Industrial Worker, 1840–1860.

# LIST OF BULLETINS OF THE BUREAU OF LABOR STATISTICS

*The following is a list of all bulletins of the Bureau of Labor Statistics published since July, 1912, except that in the case of bulletins giving the results of periodic surveys of the bureau only the latest bulletin on any one subject is here listed.*

*A complete list of the reports and bulletins issued prior to July, 1912, as well as the bulletins published since that date, will be furnished on application. Bulletins marked thus* (*) *are out of print.*

**Conciliation and Arbitration (including strikes and lockouts).**

*No. 124. Conciliation and arbitration in the building trades of Greater New York. [1913.]
*No. 133. Report of the industrial council of the British Board of Trade on its inquiry into industrial agreements. [1913.]
No. 139. Michigan copper district strike. [1914.]
No. 144. Industrial court of the cloak, suit, and skirt industry of New York City. [1914.]
No. 145. Conciliation, arbitration, and sanitation in the dress and waist industry of New York City. [1914.]
*No. 191. Collective bargaining in the anthracite coal industry. [1916.]
*No. 198. Collective agreements in the men's clothing industry. [1916.]
No. 233. Operation of the industrial disputes investigation act of Canada. [1918.]
No. 255. Joint industrial councils in Great Britain. [1919.]
No. 283. History of the Shipbuilding Labor Adjustment Board, 1917 to 1919.
No. 287. National War Labor Board: History of its formation, activities, etc. [1921.]
No. 303. Use of Federal power in settlement of railway labor disputes. [1922.]
No. 341. Trade agreement in the silk-ribbon industry of New York City. [1923.]
No. 402. Collective bargaining by actors. [1926.]
No. 468. Trade agreements, 1927.
No. 481. Joint industrial control in the book and job printing industry. [1928.]

**Cooperation.**

No. 313. Consumers' cooperative societies in the United States in 1920.
No. 314. Cooperative credit societies in America and in foreign countries. [1922.]
No. 437. Cooperative movement in the United States in 1925 (other than agricultural).

**Employment and Unemployment.**

*No. 109. Statistics of unemployment and the work of employment offices [in the United States]. [1913.]
No. 172. Unemployment in New York City, N. Y. [1915.]
*No. 183. Regularity of employment in the women's ready-to-wear garment industries. [1915.]
*No. 195. Unemployment in the United States. [1916.]
No. 196. Proceedings of the Employment Managers' Conference held at Minneapolis, Minn., January 19 and 20, 1916.
*No. 202. Proceedings of the conference of Employment Managers' Association of Boston, Mass., held May 10, 1916.
No. 206. The British system of labor exchanges. [1916.]
No. 227. Proceedings of the Employment Managers' Conference, Philadelphia, Pa., April 2 and 3, 1917.
No. 235. Employment system of the Lake Carriers' Association. [1918.]
*No. 241. Public employment offices in the United States. [1918.]
No. 247. Proceedings of Employment Managers' Conference, Rochester, N. Y., May 9–11, 1918.
No. 310. Industrial unemployment: A statistical study of its extent and causes. [1922.]
No. 409. Unemployment in Columbus, Ohio, 1921 to 1925.

**Foreign Labor Laws.**

*No. 142. Administration of labor laws and factory inspection in certain European countries. [1914.]
No. 494. Labor legislation of Uruguary. (In press.)

**Housing.**

*No. 158. Government aid to home owning and housing of working people in foreign countries. [1914.]
No. 263. Housing by employers in the United States. [1920.]
No. 295. Building operations in representative cities in 1920.
No. 469. Building permits in the principal cities of the United States in [1921 to] 1927.

**Industrial Accidents and Hygiene.**

*No. 104. Lead poisoning in potteries, tile works, and porcelain enameled sanitary ware factories. [1912.]
No. 120. Hygiene of the painters' trade. [1913.]
*No. 127. Dangers to workers from dust and fumes, and methods of protection. [1913.]

**Industrial Accidents and Hygiene**—Continued.

*No. 141. Lead poisoning in the smelting and refining of lead. [1914.]
*No. 157. Industrial accident statistics. [1915.]
*No. 165. Lead poisoning in the manufacture of storage batteries. [1914.]
*No. 179. Industrial poisons used in the rubber industry. [1915.]
No. 188. Report of British departmental committee on the danger in the use of lead in the painting of buildings. [1916.]
*No. 201. Report of committee on statistics and compensation insurance cost of the International Association of Industrial Accident Boards and Commissions. [1916.]
*No. 207. Causes of death, by occupation. [1917.]
*No. 209. Hygiene of the printing trades. [1917.]
*No. 219. Industrial poisons used or produced in the manufacture of explosives. [1917.]
No. 221. Hours, fatigue, and health in British munition factories. [1917.]
No. 230. Industrial efficiency and fatigue in British munition factories. [1917.]
*No. 231. Mortality from respiratory diseases in dusty trades (inorganic dusts). [1918.]
*No. 234. Safety movement in the iron and steel industry, 1907 to 1917.
No. 236. Effects of the air hammer on the hands of stonecutters. [1918.]
No. 249. Industrial health and efficiency. Final report of British Health of Munition Workers' Committee. [1919.]
*No. 251. Preventable death in the cotton-manufacturing industry. [1919.]
No. 256. Accidents and accident prevention in machine building. [1919.]
No. 267. Anthrax as an occupational disease. [1920.]
No. 276. Standardization of industrial accident statistics. [1920.]
No. 280. Industrial poisoning in making coal-tar dyes and dye intermediates. [1921.]
No. 291. Carbon-monoxide poisoning. [1921.]
No. 293. The problem of dust phthisis in the granite-stone industry. [1922.]
No. 298. Causes and prevention of accidents in the iron and steel industry, 1910–1919.
No. 306. Occupational hazards and diagnostic signs: A guide to impairments to be looked for in hazardous occupations. [1922.]
No. 339. Statistics of industrial accidents in the United States. [1923.]
No. 392. Survey of hygienic conditions in the printing trades. [1925.]
No. 405. Phosphorus necrosis in the manufacture of fireworks and in the preparation of phosphorus. [1926.]
No. 425. Record of industrial accidents in the United States to 1925.
No. 426. Deaths from lead poisoning. [1927.]
No. 427. Health survey of the printing trades, 1922 to 1925.
No. 428. Proceedings of the Industrial Accident Prevention Conference, held at Washington, D. C., July 14–16, 1926.
No. 460. A new test for industrial lead poisoning. [1928.]
No. 466. Settlement for accidents to American seamen. [1928.]
No. 488. Deaths from lead poisoning, 1925–1927. [In press.]
No. 490. Statistics of industrial accidents in the United States to the end of 1927. (In press.)

**Industrial Relations and Labor Conditions.**

No. 237. Industrial unrest in Great Britain. [1917.]
No. 340. Chinese migrations, with special reference to labor conditions. [1923.]
No. 349. Industrial relations in the West Coast lumber industry. [1923.]
No. 361. Labor relations in the Fairmont (W. Va.) bituminous-coal field. [1924.]
No. 380. Postwar labor conditions in Germany. [1925.]
No. 383. Works council movement in Germany. [1925.]
No. 384. Labor conditions in the shoe industry in Massachusetts, 1920–1924.
No. 399. Labor relations in the lace and lace-curtain industries in the United States. [1925.]
No. 483. Conditions in the shoe industry in Haverhill, Mass., 1928.

**Labor Laws of the United States (including decisions of courts relating to labor).**

No. 211. Labor laws and their administration in the Pacific States. [1917.]
No. 229. Wage-payment legislation in the United States. [1917.]
No. 285. Minimum-wage laws of the United States: Construction and operation. [1921.]
No. 321. Labor laws that have been declared unconstitutional. [1922.]
No. 322. Kansas Court of Industrial Relations. [1923.]
No. 343. Laws providing for bureaus of labor statistics, etc. [1923.]
No. 370. Labor laws of the United States, with decisions of courts relating thereto. [1925.]
No. 408. Laws relating to payment of wages. [1926.]
No. 444. Decisions of courts and opinions affecting labor, 1926.
No. 467. Minimum wage legislation in various countries. [1928.]
No. 486. Labor legislation of 1928. (In press.)

**Proceedings of Annual Conventions of the Association of Governmental Labor Officials of the United States and Canada. (Name changed in 1928 to Association of Governmental Officials in Industry of the United States and Canada.)**

*No. 266. Seventh, Seattle, Wash., July 12–15, 1920.
No. 307. Eighth, New Orleans, La., May 2–6, 1921.
No. 323. Ninth, Harrisburg, Pa., May 22–26, 1922.
No. 352. Tenth, Richmond, Va., May 1–4, 1923.
*No. 389. Eleventh, Chicago, Ill., May 19–23, 1924.
*No. 411. Twelfth, Salt Lake City, Utah, August 13–15, 1925.
No. 429. Thirteenth, Columbus, Ohio, June 7–10, 1926.
No. 455. Fourteenth, Paterson, N. J., May 31 to June 3, 1927.
No. 480. Fifteenth, New Orleans, La., May 15–24, 1928.

**Proceedings of Annual Meetings of the International Association of Industrial Accident Boards and Commissions.**

No. 210. Third, Columbus, Ohio, April 25–28, 1916.
No. 248. Fourth, Boston, Mass., August 21–25, 1917.
No. 264. Fifth, Madison, Wis., September 24–27, 1918.
*No. 273. Sixth, Toronto, Canada, September 23–26, 1919.
No. 281. Seventh, San Francisco, Calif., September 20–24, 1920.
No. 304. Eighth, Chicago, Ill., September 19–23, 1921.
No. 333. Ninth, Baltimore, Md., October 9–13, 1922.
No. 359. Tenth, St. Paul, Minn., September 24–26, 1923.
No. 385. Eleventh, Halifax, Nova Scotia, August 26–28, 1924.
No. 395. Index to proceedings, 1914–1924.
No. 406. Twelfth, Salt Lake City, Utah, August 17–20, 1925.
No. 432. Thirteenth, Hartford, Conn., September 14–17, 1926.
No. 456. Fourteenth, Atlanta, Ga., September 27–29, 1927.
No. 485. Fifteenth, Paterson, N. J., September 11–14, 1928. (In press.)

**Proceedings of Annual Meetings of the International Association of Public Employment Services.**

No. 192. First, Chicago, December 19 and 20, 1913; second, Indianapolis, September 24 and 25, 1914; third, Detroit, July 1 and 2, 1915.
No. 220. Fourth, Buffalo, N. Y., July 20 and 21, 1916.
No. 311. Ninth, Buffalo, N. Y., September 7–9, 1921.
No. 337. Tenth, Washington, D. C., September 11–13, 1922.
No. 355. Eleventh, Toronto, Canada, September 4–7, 1923.
No. 400. Twelfth, Chicago, Ill., May 19–23, 1924.
No. 414. Thirteenth, Rochester, N. Y., September 15–17, 1925.
No. 478. Fifteenth, Detroit, Mich., October 25–28, 1927.

**Productivity of Labor.**

No. 356. Productivity costs in the common-brick industry. [1924.]
No. 360. Time and labor costs in manufacturing 100 pairs of shoes, 1923.
No. 407. Labor cost of production and wages and hours of labor in the paper box-board industry. [1926.]
No. 412. Wages, hours, and productivity in the pottery industry, 1925.
No. 441. Productivity of labor in the glass industry. [1927.]
No. 474. Productivity of labor in merchant blast furnaces. [1928.]
No. 475. Productivity of labor in newspaper printing. [1928.] (In press.)

**Retail Prices and Cost of Living.**

*No. 121. Sugar prices, from refiner to consumer. [1913.]
*No. 130. Wheat and flour prices, from farmer to consumer. [1913.]
No. 164. Butter prices, from producer to consumer. [1914.]
No. 170. Foreign food prices as affected by the war. [1915.]
No. 357. Cost of living in the United States. [1924.]
No. 369. The use of cost-of-living figures in wage adjustments. [1925.]
No. 495. Retail prices, 1890 to 1928. (In press.)

**Safety Codes.**

*No. 331. Code of lighting: Factories, mills, and other work places.
No. 336. Safety code for the protection of industrial workers in foundries.
No. 350. Specifications of laboratory tests for approval of electric headlighting devices for motor vehicles.
No. 351. Safety code for the construction, care, and use of ladders.
No. 375. Safety code for laundry machinery and operation.
No. 378. Safety code for woodworking plants.
No. 382. Code for lighting school buildings.
No. 410. Safety code for paper and pulp mills.
No. 430. Safety code for power presses and foot and hand presses.
No. 433. Safety codes for the prevention of dust explosions.
No. 436. Safety code for the use, care, and protection of abrasive wheels.

**Safety Codes**—Continued.

No. 447. Safety code for rubber mills and calenders.
No. 451. Safety code for forging and hot-metal stamping.
No. 463. Safety code for mechanical power-transmission apparatus—first revision.

**Vocational Workers' Education.**

*No. 159. Short-unit courses for wage earners, and a factory school experiment. [1915.]
*No. 162. Vocational education survey of Richmond, Va. [1915.]
No. 199. Vocational education survey of Minneapolis, Minn. [1917.]
No. 271. Adult working-class education in Great Britain and the United States. [1920.]
No. 459. Apprenticeship in building construction. [1928.]

**Wages and Hours of Labor.**

*No. 146. Wages and regularity of employment and standardization of piece rates in the dress and waist industry of New York City. [1914.]
*No. 147. Wages and regularity of employment in the cloak, suit, and skirt industry. [1914.]
No. 161. Wages and hours of labor in the clothing and cigar industries, 1911 to 1913.
No. 163. Wages and hours of labor in the building and repairing of steam railroad cars, 1907 to 1913.
*No. 190. Wages and hours of labor in the cotton, woolen, and silk industries, 1907 to 1914.
No. 204. Street-railway employment in the United States. [1917.]
No. 225. Wages and hours of labor in the lumber, millwork, and furniture industries, 1915.
No. 265. Industrial survey in selected industries in the United States, 1919.
No. 297. Wages and hours of labor in the petroleum industry, 1920.
No. 356. Productivity costs in the common-brick industry. [1924.]
No. 358. Wages and hours of labor in the automobile-tire industry, 1923.
No. 360. Time and labor costs in manufacturing 100 pairs of shoes, 1923.
No. 365. Wages and hours of labor in the paper and pulp industry, 1923.
No. 394. Wages and hours of labor in metalliferous mines, 1924.
No. 407. Labor cost of production and wages and hours of labor in the paper box-board industry. [1926.]
No. 412. Wages, hours, and productivity in the pottery industry, 1925.
No. 416. Hours and earnings in anthracite and bituminous coal mining, 1922 and 1924.
No. 435. Wages and hours of labor in the men's clothing industry, 1911 to 1926.
No. 438. Wages and hours of labor in the motor-vehicle industry, 1925.
No. 442. Wages and hours of labor in the iron and steel industry, 1907 to 1926.
No. 452. Wages and hours of labor in the hosiery and underwear industries, 1907 to 1926.
No. 454. Hours and earnings in bituminous-coal mining, 1922, 1924, and 1926.
No. 471. Wages and hours of labor in foundries and machine shops, 1927.
No. 472. Wages and hours of labor in the slaughtering and meat packing, 1927.
No. 476. Union scales of wages and hours of labor, 1927. [Supplement to Bul. No. 457.]
No. 482. Union scales of wages and hours of labor, May 15, 1928.
No. 484. Wages and hours of labor of common street laborers, 1928. (In press.)
No. 487. Wages and hours of labor in woolen and worsted goods manufacturing, 1910 to 1928. (In press.)
No. 492. Wages and hours of labor in cotton-goods manufacturing, 1910 to 1928.
No. 497. Wages and hours of labor in the lumber industry in the United States, 1928.
No. 498. Wages and hours of labor in the boot and shoe industry, 1907 to 1926.

**Welfare Work.**

*No. 123. Employers' welfare work. [1913.]
No. 222. Welfare work in British munitions factories. [1917.]
*No. 250. Welfare work for employees in industrial establishments in the United States. [1919.]
No. 458. Health and recreation activities in industrial establishments, 1926.

**Wholesale Prices.**

No. 284. Index numbers of wholesale prices in the United States and foreign countries. [1921.]
No. 440. Wholesale prices, 1890 to 1926.
No. 453. Revised index numbers of wholesale prices, 1923 to July, 1927.
No. 493. Wholesale prices, 1913 to 1928. (In press.)

**Women and Children in Industry.**

No. 116. Hours, earnings, and duration of employment of wage-earning women in selected industries in the District of Columbia. [1913.]
*No. 117. Prohibition of night work of young persons. [1913.]
No. 118. Ten-hour maximum working-day for women and young persons. [1913.]
No. 119. Working hours of women in the pea canneries of Wisconsin. [1913.]
*No. 122. Employment of women in power laundries in Milwaukee. [1913.]
No. 160. Hours, earnings, and conditions of labor of women in Indiana mercantile establishments and garment factories. [1914.]
*No. 167. Minimum-wage legislation in the United States and foreign countries. [1915.]
*No. 175. Summary of the report on condition of women and child wage earners in the United States. [1915.]
No. 176. Effect of minimum-wage determination in Oregon. [1915.]
*No. 180. The boot and shoe industry in Massachusetts as a vocation for women. [1915.]

**Women and Children in Industry**—Continued.

*No. 182. Unemployment among women in department and other retail stores of Boston, Mass. [1916.]
No. 193. Dressmaking as a trade for women in Massachusetts. [1916.]
No. 215. Industrial experience of trade-school girls in Massachusetts. [1917.]
*No. 217. Effect of workmen's compensation laws in diminishing the necessity of industrial employment of women and children. [1918.]
No. 223. Employment of women and juveniles in Great Britain during the war. [1917.]
No. 253. Women in the lead industries. [1919.]

**Workmen's Insurance and Compensation (including laws relating thereto).**

*No. 101. Care of tuberculous wage earners in Germany. [1912.]
*No. 102. British national insurance act, 1911.
No. 103. Sickness and accident insurance law of Switzerland. [1912.]
No. 107. Law relating to insurance of salaried employees in Germany. [1913.]
*No. 155. Compensation for accidents to employees of the United States. [1914.]
No. 212. Proceedings of the conference on social insurance called by the International Association of Industrial Accident Boards and Commissions, Washington, D. C., December 5–9, 1916.
*No. 243. Workmen's compensation legislation in the United States and foreign countries, 1917 and 1918.
No. 301. Comparison of workmen's compensation insurance and administration. [1922.]
No. 312. National health insurance in Great Britain, 1911 to 1921.
No. 379. Comparison of workmen's compensation laws of the United States as of January 1, 1925.
No. 477. Public-service retirement systems, United States and Europe. [1928.]
No. 496. Workmen's compensation legislation of the United States and Canada as of January 1, 1929.

**Miscellaneous Series.**

*No. 174. Subject index of the publications of the United States Bureau of Labor Statistics up to May 1, 1915.
No. 208. Profit sharing in the United States. [1916.]
No. 242. Food situation in central Europe, 1917.
No. 254. International labor legislation and the society of nations. [1919.]
No. 268. Historical survey of international action affecting labor. [1920.]
No. 282. Mutual relief associations among Government employees in Washington, D. C. [1921.]
No. 299. Personnel research agencies: A guide to organized research in employment, management, industrial relations, training, and working conditions. [1921.]
No. 319. The Bureau of Labor Statistics: Its history, activities, and organization. [1922.]
No. 326. Methods of procuring and computing statistical information of the Bureau of Labor Statistics. [1923.]
No. 342. International Seamen's Union of America: A study of its history and problems. [1923.]
No. 346. Humanity in government. [1923.]
No. 372. Convict labor in 1923.
No. 386. Cost of American almshouses. [1925.]
No. 398. Growth of legal-aid work in the United States. [1926.]
No. 401. Family allowances in foreign countries. [1926.]
No. 420. Handbook of American trade-unions. [1926.]
No. 439. Handbook of labor statistics, 1924 to 1926.
No. 461. Labor organizations in Chile. [1928.]
No. 462. Park recreation areas in the United States. [1928.]
No. 465. Beneficial activities of American trade-unions. [1928.]
No. 479. Activities and functions of a State department of labor. [1928.]
No. 489. Care of the aged in the United States. (In press.)
No. 491. Handbook of labor statistics, 1928. (In press.)